Scientific Review

AND

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A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

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APPLICATIONS FOR LETTERS PATENT.

*** In this list (Com.) means Invention communicated from abroad.

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On October 29th.—3732 to 3746.—W. Morgan-Brown. Manufacture of scented soaps and apparatus for that purpose, to prevent loss of perfume (com.)—A. Macklin. Stowage, for transport, and storing of gunpowder and other explosive materials.—C. Hodgson. Obtaining equilibrium and steadiness in floating structures, and improvements in the mode of building such structures so as to attain the aforesaid object.—A. Tylor. Water closets, lavatories, and other apparatus relating to sanitary arrangements and the parts connected therewith, also cocks, valves, ball or float valves, hydrants, and apparatus for containing, measuring, controlling, regulating, and arresting the water supply of the same, and for other purposes.—J. Low and R. Houston. Netting machinery.—H. Dubs. Reversing gear for steam-engines.—L. C. Marshall. Carding machines for carding flax tow.—J. Jowett and G. Hunter. Means or method employed for consuming smoke and economizing fuel.—J. R. Sawyer. Production of photographic prints.—E. R. Hollands. Construction of irons to be heated by gas.—N. Brough. Boxes or cases for matches, needles, pins, cigars, and other articles.—J. Whittaker. Machinery or apparatus for making compressed bricks, tiles, or other similar articles.—J. A. R. Morison. Construction of roadways and other surfaces.—J. F. Dickson. Preservation of animal substances from decay.—J. S. Wallace and E. Tucker. Preparing materials to be introduced into burning buildings or structures to produce carbonic acid gas or other gas for extinguishing the fire in the same.

On October 30th.—3747 to 3760.—E. Saunders. Apparatus for propelling boats on the water.—W. H. Dorman. Method of attaching buttons to boots or other articles of apparel.—H. Defries. Railway carriage roof lamps, applicable also to other fountain lamps.—C. A. Calvert. Construction of velocipedes.—G. Mackay. Process of purifying liquids and recovering matter contained therein.—L. E. Broadbent. Machinery employed in weaving and finishing woollen, cotton, or other fabrics.—F. Bardo. Calendar or almanac and advertising medium.—T. Large Apparatus for signalling upon railways.—J. Stone. Furnaces or apparatus employed in the manufacture and casting of iron, steel, and other metals,—W. H. Kent. Machines for cleaning and polishing knives and other metal articles.—M. Zingler. Treating aniline and other dyes to prepare them for use in dyeing, printing, and colouring,—M. Zingler. Varnishes and compositions for coating ships' bottoms.—W. Shears. Centrifugal machines.—G. Taylor Casting chilled rolls and apparatus employed for that purpose.

On October 31st.—3761 to 3771.—W. Lyttle. Smelting of iron.—E. Guthrie. Paving.—G. Wilson. Variable cut-off motion for steam engines (com.)—H. Woolhouse. Construction of sheep shears.—E. C. H. Krueger. Apparatus for cutting wood.—E. Edwards. Manufacture of soap and apparatus used in such manufacture, also applicable to other purposes (com.)—B. C. Simpson. Reactionary spring brake to arrest or retard the motion of tramway, railway, or ordinary road carriages or waggons, and set them in motion again by the force created by their arrest.—S. Holman. Condensers for direct-acting steam pumping and other steam engines.—S. H. Johnson, F.C.S. Apparatus for crushing or breaking stone and other substances.—J. C. W. Jefferys. Studs, solitaires, and other fastenings or ornaments for dress.—A. M. Clark. Electrical commutator, together with the application of the same (com.)

On November 2nd.—3772 to 3783.—W. R. Bull. Ice-creepers or instruments for enabling the wearer to walk safely on ice (com.)—G. F. Church. Air-picking looms for wearing.—O. Robinson. Sewing machines.—M. J. Roberts. Apparatus for hoisting, lowering, pulling, and retaining at any desired point, weights or bodies, part of which invention is applicable to driving machinery.—S. Chadwick and T. W. Condron. Backs and handles for brushes.—A. Bell. Steam generators and apparatus to be employed in connection therewith.—S. Turton, W. Jolley, and J. T. Birchall. Diminishing valves or apparatus for regulating the pressure of liquids and fluids.—J. H. Johnson. Slide valves, which improvements are also applicable to other rubbing surfaces (com.)—G. J. Snelus. Treatment of solutions containing metals and soda and other salts, for effecting the separation of the same.—C. A. Faure. Explosive compounds for mining and other purposes.—A. V. Newton. Lighting illuminating gas and fulminating compounds applicable thereto, and for other purposes (com.)—E. Bennis. Mechanically feeding furnaces with fuel, and apparatus connected therewith.

On November 3rd.—3784 to 3798.—B. H. Vallé. Treatment and utilization of sewage and means employed therein.—J. F. Enright. Self-disconnecting circular hook.—W. E. Gedge. Goffering woven fabrics (com.)—H. Hughes. Portable and other steam engines and boilers for the same.—L. Salomons. Weaving apparatus (com.)—J. W. Barns. Dredgers and dredging, and machinery or apparatus employed therefor.—W. R. Lake.—Refrigerators (com.)—L. J. F. Lemeunier and C. A. Martin.—Apparatus for heating railway carriages, public buildings, greenhouses, prisons, and apartments.—T. B. Fogarty. Apparatus for carburetting air or other gaseous bodies.—W. Bevan. Electric point indicator apparatus for railways.—J. J. Turner. Construction and working of railways and wheels for railway and tramway rolling stock.—W. Hackney. Production of an improved quality of coke.—W. R. Marsh. Meal machine for treating and preparing rice.—W. E. Newton. Apparatus for sizing warps (com.)—W. Wilson. Chaff cutters, &c.

On November 4th.—3799 to 3812.—F. T. Bond. Deodorising and disinfecting materials and apparatus for applying the same.—H. Timmins. Arrangements for connecting and joining the wires used for electric telegraphs, and also the wires and wire ropes used for fencing.—J. Stone. Composition for coating steam boilers.—J. H. Johnson. Obtaining motive power and machinery or apparatus employed therefor (com.)—W. E. Gedge. Screw cutter or screw stock (com.)—A. Dixon. Test, try, or gauge cocks for ascertaining the height or level of water or other liquids, or of steam in steam or other boilers or vessels.—M. Jewett. Construction of carriages.—W. R Lake. Machinery for grinding and polishing the surface of stone and metal (com.)—J. H. Johnson. Apparatus for drawing or raising water or other liquids (com.)—T. Hawksworth and J. Chaffer. Apparatus for washing clothes and other similar articles (com.)—J. Tilley. Manufacture of articles known as "Scotch bonnets," and other plain and fancy hosiery, and machinery employed in such manufacture.—W. R. Marsh. Construction of barley mills and mode of employing the same for dressing and cleaning rice or other grain.—W. R. Marsh. Riddle for separating rice.—W. Sumner and E. H. Waldenstrom. Copper singe plates.

On November 5th.—3813 to 3826.—T. W. Rammell. Centrifugal machines for throwing air and other fluids and communicating motive power thereby.—E. P. Alexander. Apparatus for opening oysters, applicable also for cutting or slicing bread and other substances, and for breaking hard substances generally (com.)—J. Edwards. Bottles for containing aërated liquids and stoppers applicable thereto, such stoppers being also applicable for other purposes.—M. W. M. van Swyndregt. Method of fastening false fronts to shirts.—C. Frati. Mechanical organs or wind instruments of the military concert or band and similar description, sometimes called "orchestreons."—J. Burling. Machine for trimming wall papers (partly com.)—J. P. Labrousse. Machinery for the manufacture of paper pulp.—R. Ventress. Wood-cutting and wood-working machinery.—H. B. Meech. Process and machiney for obtaining from various vegetable substances fibres suitable for spinning and felting purposes.—J. H. Johnson. Cartridges, shells, or explosive projectiles (com.)—F. A. Yeo. Moulding presses.—N. Thompson. Stoppers for bottles, jars, and other hollow articles.—S. Morley. Apparatus for signalling on railways.—E. E. Colley. Printing machines and apparatus for preparing paper for printing.

On November 6th.—3827 to 3839.—A. Parry. Apparatus for drying white lead and similar substances, evaporating chemical and other liquids, and for other like purposes.—F. W. Paul. Hats, applicable for ladies' or gentlemen's wear.—J. Dodge. Apparatus for exhausting or forcing air and gases.—B. Sheil. Manufacture of blocks for paving roads and ways.—A. Watt. Balloons, and the method and apparatus for inflating the same.—C. Hirschhorn. Manufacture of shirt collars, cuffs, shirt-fronts, and other such like articles of wearing apparel (com.)—F. H. Lloyd. Tuyeres for blast furnaces and other furnaces and forges.—J. Monks. Method of and apparatus or appliances for shaving or removing hair from the beard or other part or parts of the human body, applicable also to other shaving or cutting purposes.—J. Bélicard and R. Roberts. Apparatus for effecting the regular "letting off" of the yarn from the beam in looms for weaving.—B. Munro. Tools for cutting stone, coal, slate, marble, or similar materials.—F. Render. Apparatus for guarding against the absence of wheat and other grain from millstones when at work.—T. Martin. Lamps, and apparatus for lighting the same.—E. Perrett. Steam tram-cars.

On November 7th.—3840 to 3854.—S. R. Smyth and J. Simpson. Production and manufacture of iron and steel, and the apparatus and compounds employed therein.—E. Earnshaw and T. Holt. Steam-engines.—W. Davenport. Method of regulating the tension of signal or other wires.—R. M. Marchant. Manufacture of gas.—G. Fletcher. Machinery for the manufacture of sugar, parts of which are also applicable to other purposes.—A. Manning and B. Tydeman. Method of and apparatus for beating coffee and other seed casks.—J. Amos. Means of packing and distributing flour for use.—J. W. Morgan. Annealing pots, boxes, stands, and retorts.—W. Summerscales, S. Summerscales, and J. Summerscales. Machinery or apparatus for cutting hay and similar substances into "chaff."—C. H. J. Achenbach. Manufacture of socks or inner soles for boots and shoes (com.)—J. Burton. Sprigged, spotted, or figured nets made on the bobbin net or twist lace machines.—W. A. P. La Grove. Mechanical toy.—A. M. Clark. Machinery for making cigarettes (com.)—W. R. Lake. Apparatus for the manufacture of distilled water (com.)—T. Mayor. Spinning machinery (partly com.)

On November 9th.—3855 to 3866.—W. Froggatt and John Ballard. Internal stud stoppers for aerated water bottles.—C. Turner. Machinery and apparatus for scudding, fleshing, shaving, scouring, striking out, grounding, and removing the wool or hair from skins or hides.—E. Jones and G. F. Thomson. Prevention of accidents in the use of water tuyeres and other appliances when water is used in and about blast and other furnaces.—C. E. Darcy and J. Green. Blast or smelting furnaces.—T. Harding. Ventilating sewers, shafts, and stacks, and consuming, destroying, disinfecting, or deodorizing the vapour or sewer gas arising from sewers.—E. Stone. Loom weft-stop mechanisms (com.)—J. Armstrong and R. H. Neill. Flour-dressing machines.—J. Revell. Machinery for spinning cotton, silk, wool, flax, or other fibrous substances, and apparatus for lubricating such machinery.—J. Hill and J. E. Hey. Ventilators.—J. Taylor, J. S. Taylor, and S. W. Challen. Machinery for the manufacture of nuts for screws.—J. Brunt and W. A. White. Brick-making machinery.—G. W. Richardson. Pneumatic apparatus.

On November 10th.—3867 to 3878.—F. Wright. Gas governors.—H. Matthews. Arrangements and apparatus for removing gases from sewers and effecting the consumption thereof.—J. E. Commerell. Construction of rudders.—D. Barker. Manufacture of artificial fuel.—J. Chappell. Construction of self-acting coupling and disconnecting gear for railway carriages and trucks.—H. Scha'lehn. Wire mattresses and seats (com.)—R. Hilton. Circular saw benches.—D. Dubbin. Combined chair and table for children.—E. France. Manufacture of boots and shoes.—Rev. G. H. Forbes. Manufacture of artificial fuel.—A. M. Clark. Processes and machinery for the manufacture of pulp for paper from a certain plant, and obtaining a useful product therefrom (com.)

On November 11th.—3878 to 3894.—J. Carter. Manufacture of barrels (com.)—A. M. Clark. Musical instrument known as the Pyrophone, together with the applications of the same (com.)—F. Dixon. Artificial fuel.—S. R. Smyth and J. Simpson. Blast furnaces for melting iron ores and other metals, and for purifying, refining, and converting the same, and also the apparatus employed therein.—E. Parkman. Means to be applied to lamps or lanterns to indicate the names of streets or other information, which means will also assist in reflecting the light from such lamps or lanterns.—P. Brotherhood. Slide valves for reciprocating engines.—D. Oppenheimer. Manufacture of drain pipes and other pipes and articles of plastic or mouldable materials, and the production of materials or compositions for the same, and apparatus employed for the said purposes (com.)—M. A. Soul. Double coat (com.)—W. R. Lake. Manufacture of boots and shoes, and machinery therefor (com.) (Complete specification.)—B. W. Davis and J. Parsons. Machinery for letter press printing.—G. Norwood and F. M. Cutler. Protectors for the bottoms of ladies' dresses (com.)—H. M. Ramsay. Method of making water-tight joints to stoneware or other pipes.—H. W. Cook. Locomotive engines for the purpose of economizing fuel.—W. J. Burgess and C. T. Burgess. Reaping and mowing machines.—J. Fairburn. Effecting the extraction of metals.—J. H. Johnson. Manufacture of tubular or hollow wooden articles or utensils, and the machinery or apparatus employed therein (com.)—H. W. Hart. Preparation of antiseptic paper for "cabinet" and other purposes.

On November 12th.—3895 to 3913.—S. R. Smyth and J. Simpson. Manufacture of wrought iron, and furnaces for puddling, balling, and heating iron and steel or other metals along with a mechanical puddler employed therein.—R. Hudson. Carding engines.—J. Parry. Construction of furniture castors.—J. S. Sutcliffe, J. S. Smith, and W. Chew. Looms for weaving.—G. T. Yull. Machinery or apparatus for raising, lowering, moving, or transporting heavy bodies, applicable also to land cultivation by steam or other power.—J. Ireland. Shuttles for weaving and arranging the cops therein.—A. B. Kempe. Means of reversing and multiplying angular motion, effecting rectilineal and parallel motions, and dividing angles.—J. Quin. Protecting indiarubber valves, tubes, and other like articles, from chemical action.—T. Wright and I. Fox. Manufacture of fabric suitable to be employed for various purposes.—T. Priestland. Liquid preparation to be employed as a means for the cure of disorders of the human eye.—J. Paris. Smoothingirons and means or apparatus for heating the same and for lighting in connection therewith.—J. Dunn. Taking off apparatus from paper-ruling machines.—G. Russell. Couplings for revolving shafts.—W. G. Valentin. Treatment of spent oxide of iron for the purpose of extracting cyanogen compounds therefrom.—C. O'Sullivan and W. G. Valentin. Treatment of starch and starchy substances, and

(*Continued on page 29*).

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FEBRUARY 1, 1875.

PRESENT POSITION OF PATENT LAW REFORM.

To any unprejudiced reflective mind it must be a matter of astonishment that there should be any difficulty whatever as to according to inventors the right to *remunerate themselves* out of the profits accruing from the use of their inventions, seeing it is an almost self-evident proposition that labour is the most legitimate foundation for property, so much so indeed that no one except a rabid Communist would have the hardihood to deny it; and yet some people who set themselves up as political economists do assert that inventive labour is not a true foundation for property, though at the same time they allow that literary labour is a good foundation for it—upholding Copyright at the same time that they impugn Patent-right. It is true that there are very few persons who deny the expediency of promoting invention by a legalised system of rewarding it; but not a few oppose the notion that there is, on principle, any absolute right attaching to the inventor in regard to his invention so as to make it his own property, holding that any legal interest that may be allowed him by the State is, by the grace of the Crown, as representing the public, in acknowledgment of the merit and public benefit of his invention.

Unfortunately, the speciousness of these views is not properly understood by a large number of the advocates of the Inventors' cause, who do not perceive that there is no soundness whatever in singling out inventors' rights as something exceptional to other proprietary interests, which, be it remembered, are all of them at variance with the natural and "good old rule, the simple plan, that he should take that hath the power, and he should keep who can"—being creations of the law for the benefit of society as promotive of industry and peacefulness—in which respects inventions must be lawworthy in the highest degree, for in our present state of society they are the very foundations of the structure of industrial advancement and prosperity. In truth, the only really exceptional matter is the fact that inventions are more difficult to protect from pillage than most other property; but this is only a weak argument in favour of improving our present judicative system so that it shall operate with due effect upon the more refined matters which our present advanced civilisation render so important, as well as those comparatively rude matters with which it has heretofore had to do. Another objection often urged against Patent property is equally subject to misapprehension, namely, that Patent-right not seldom fails to secure to the true inventor the due reward of his ingenuity and labour, this being in reality only an admission that human institutions are frequently at fault, so much so, indeed, that men have still to admit it to be true that the race is not always to the swift, or the battle to the strong; and it is well known that in many occupations and paths of enterprise the blanks far outnumber the prizes, as is notably the case in mining enterprise, the importance of which cannot be over-rated.

After all, perhaps, the great point relied upon by the opposers of Patent Law is the assertion that inventors are only anticipators, and not absolute creators—mere squatters, in fact, whose only right is founded upon the circumstance of their being the first in the field, and that very often they are not in truth the first, but only falsely claim to be so. Now there is some truth in this, but it is not true to the extent that anti-Patent Law people would have us believe; and, as far as it is true, it shows that the foundation of patent property is the same as the original foundation of property in land and its analogues, namely, first occupancy and labour.

The familiarity of our readers with the *rationale* of the Patent question may cause the utterances above given to appear as unnecessary repetitions of acknowledged truisms; but though this may be, in fact, the case, those whom we address will not consider us blameworthy by now occupying our space by repeating them, if they will only look at the position of the Patent Law question at the present time—it being this:—After years of hard fighting on the part of the Inventors' Institute, to prevent the destruction of Patent-right or property in invention, and to reform the present very defective system of Patent Law, its deputation has been received by the Chief Minister of Law—the Lord Chancellor—with courtesy and consideration, and to him the Institute has submitted a plan of reform, not as we had hoped would have been the case, the Inventors' Institute's own plan, which embodied the results of much investigation and careful thought, but simply a recommendation that his Lordship should take the American law as a basis to erect a superstructure of Patent Law possessing cheapness, preliminary examinations, extension of the term of Patent-right, and efficient Patent Office and Museum arrangements, which his Lordship may possibly seek to accomplish by following the Patent Laws of the United States at a respectful distance by changes that will be anything but improvements. We predict they will be to the following effect:

1. Perhaps, some trifling reduction as to cost.
2. A system of preliminary examination, which shall grant or refuse patents, upon some arbitrary notions of worthiness or unworthiness.
3. Addition to South Kensington in the form of a gigantic Patent Museum, of so costly a character that *in futuro* the inventor will have to be further burdened and taxed to support it.
4. And at the same time the inventor will, by a so-called compulsory license system, be rigidly restricted to such a percentage of remuneration as Government Commissioners may think fit to award.

And in doing this, his Lordship will doubtless be supported by Cole and Co. and his friends in the Adelphi, and we see no way to avoid such an evil change but by the Inventors' Institute bringing forward their Invention-right Bill, as a practical realisation of the inventor's claim of his *right* to a property in his own invention—*the first assertion of which shall entail only a trifling expense,*—whether his invention be small or great, or capable of yielding only a very modest return, or of bringing a great fortune, as to which the inventor and the public must be content to settle matters as all other business is settled.

Reviews.

DR. HARTWIG ON PHENOMENA AND LIFE OF THE ATMOSPHERE.

"The Aerial World." A Popular Account of the Phenomena and Life of the Atmosphere. By G. HARTWIG, M. and P.D., Author of "The Sea and its Living Wonders," "The Tropical World," &c., with Eight Cromo-xylographic Plates, a Map, and numerous Woodcuts. London: Longmans, Green, and Co.

IT is always delightful to take up a book of Dr. Hartwig's; one is sure of scientific reading in a pleasant form, not perhaps of a character technically so scientific as in works we are accustomed to call text-books, but containing withal just as much science as the great majority of readers, even though of a scientific turn of mind, can well manage to mentally assimilate; and conveying quite as much of it, and presented in such manner as men of culture who have not the scientific turn of thought will be likely to attentively peruse; hence most important as conducing to the advancement of knowledge in a direction very beneficial to society, since natural and experimental philosophy are thereby rendered agreeable to many to whom they might be repulsive when presented in their formal character.

The work now under consideration is no exception to these views of Dr. Hartwig's writings; it is pleasant to read, and conveys much scientific and mental instruction. The author states that he has not sought to enter into minute details or learned disquisitions such as would be required in a handbook of meteorology, but to give a general view of the phenomena of the atmosphere; which in our view of the matter, he has successfully accomplished, with the addition of much scientific detail, for he gives a review of our knowledge in regard to the magnitude and pressure of the atmosphere; the ingredients of the atmosphere; the propagation of sound through the air; echo; colour of the sky, dawn and twilight; the temperature of the atmosphere; the winds; water-spouts, land-spouts, and tornadoes; fogs, dew, clouds, rain, and the rainbow, as to which we cannot refrain from quoting the following account of

EXTRAORDINARY RAINBOWS.

On August 10, 1665, a faint rainbow was seen at Chartres, crossing the primary rainbow at its vertex; it was formed by reflection from the river. On August 6, 1698, Dr. Halley, when walking on the walls of Chester, observed a remarkable rainbow, having a primary bow, a secondary one, and a new bow, intersecting the latter and dividing it nearly into three parts. Where the two arches of the secondary and new bow coincided, the secondary iris for a great space lost its colours, and appeared like a white arch at the top. The new bow had its colours in the same order as the primary one, and consequently the reverse of the secondary bow, and on this account the two opposite spectra counteracted each other and produced whiteness. The sun at this time shone on the river Dee, and Dr. Halley found that the new bow was only that part of the circle of the primary bow that would have been under the castle, bent upwards by reflection from the river.

A third rainbow seen between the two common ones, and not concentric with them, is described in "Rozier's Journal," and is doubtless the same phenomenon as that observed by Dr. Halley. Red rainbows, distorted rainbows, and inverted rainbows on the grass, have been seen. The latter are formed by the drops of rain suspended on the spiders' webs in the fields.

The moon sometimes produces rainbows like the sun, but they are very pale. In the writings of Amerigo Vespucci we find it mentioned that he saw the iris at night several times; and to this assertion, which may be true or not, as veracity was not among his virtues, he adds the following ridiculous remarks, which give us at least an idea of the meteorological opinions of his day. Attributing the red of the arch to fire, the green to the earth, the yellow to the air, and the blue to the waters, he terminates by saying that "this sign will cease to appear when the elements are used up, forty years before the end of the world."

When the sea is very stormy, and the crests of the waves are perpetually dissolving in spray, the rays of the sun give rise to the phenomenon of marine rainbows, often twenty or thirty at a time, which almost always, however, show only two colours—yellow towards the sun, and pale green on the opposite side. "It was on the fifth day of our voyage," says Dr. Wagner, "at the entrance of the Caribbean Sea, when a change took place in the aspect of the sky. The mighty cumulo-stratus which generally towards noon predominated among the cloud-forms, now passed into a one-coloured grey nimbus. At three o'clock in the afternoon an abundant precipitation of rain took place. The sun stood near to the zenith in an oblique direction from the spot where, over the surface of the sea, the rain, falling in thick drops, filled the air with vapours. While the grey nimbus was dispersing under the beams of the sun, a magnificent rainbow was formed, not in the clouds, but upon the surface of the sea. While the undulatory motion of the waves was moderate, this marine rainbow advanced towards the ship, expanding into a constantly widening arc. The intensity of the colours varied accordingly as the sun shone freely or cast a fainter light through a misty veil. This singular meteorological play repeated itself several times, but with less beautiful colours."

Not only high in the clouds does Iris span her many-coloured arch, she also mirrors herself in the misty vapours of the waterfall or the fountain. When the glistening sunbow combines with the roar of the cataract, it forms one of the most charming scenes in the wide realms of Nature. Whoever, on a bright sunny morning, has seen its play of colours in the curling mists of the Staubbach or the Rhinefall will surely never forget the beautiful spectacle as long as his memory lasts.

"The majestic valley below the Falls of Niagara," says Dickens, "so seen through the vast cloud of spray, was made of rainbow. The high banks, the riven rocks, the forests, the bridge, the buildings, the air, the sky, were all made of rainbow. Nothing in Turner's finest water-colour drawings, done in his greatest day, is so ethereal, so imaginative, so gorgeous in colour, as what I then beheld. I seemed to be lifted from the earth, and to be looking into heaven."

Following rainbows, we have much information as to mirage, halos and mocksuns and moons, snow, thunderstorms, the cyclone, ignis fatuus, hail, aerolites, aurora borealis, and australis. And the atmosphere is fully treated of in regard to several different heads, including the question of its primeval character, its alternations of intense cold, shown by glacial deposits, and of tropical heat, as proved by geological fauna.

The aerial life of insects, of birds, bats, and flying fishes form the subject of very interesting chapters, as does the influence of climate on the health and character of man. And the concluding portions of this interesting work, which we may, if opportunity serve, again refer to, treats of flying machines and aerial navigation generally.

BROWNE'S POETICAL EFFUSIONS.

"Stones from the Quarry; or, Moods of Mind." By HENRY BROWNE. London: Provost and Co., Henrietta-street, Covent Garden.

THIS is just such a book of poetry as a busy man of the world may be expected to read, since it is a collection of short pieces, which may be read at the intervals of rest from prosaic toil. We give, as a specimen, one of the longest and one of the shortest of Mr. Browne's poetical efforts:—

"UNDER THE SURFACE.

Tears have been stored in lachrymatories;
Though *such* few shed—shed, fewer care to keep.
More evanescent, Smiles; yet some leave deep
And lasting trace, though proof it all defies.
Let Cassius smile, great Cæsar lives, Fate lies!
Looks, like Minerva from Jove's brain, may leap
To instant life and action; action creep
Like tortoise to his purpose while *it* flies.
Kisses are but the matches to desire,
Which kindle and burn out; yet that first kiss
To Juliet, lit, as 'twere, a funeral pyre,
And Death made use of Love's own torch for his.
A Cleopatra's kiss a World could fire,
And courtly Death gave Love the *pas* too in this!

Least underlieth Greatest; often things
As unconcerning disregarded cause
The failure of great actions, or their pause;
A word, just then and there, *so* spoken, flings
A stone of offence in the way of kings,
Or stays a host. An unfulfilled clause
In Fortune's deed of gift forfeits or flaws
The title, and a Nemesis so brings.
Sometimes a scornèd agent, a mere "nought"
Before the counting figure, which doth fill
The World's large gaze, hath tenfold value brought.
Placed *after*—poor tool used with higher skill;
And Love, blind Love, in Fate's dark meshes caught,
Self-executioner, does but Death's will!

When Romeo sealed, with that impressive kiss
On Juliet's wax-soft lip, supposed bond
Of dateless love, misjudging, with Youth's fond
Self-trust, alike the treachery which is
In things intrinsic, as that worse, of his
Unknowing heart, which looketh not beyond;
Death, all-unseen, heard Love and Hope respond,
And signed, with their aye-cursive and remiss,
His fast-bind signature! And while their faint
And airy tracings, light and flowery,
Servile to all, yet (fresh) so free from taint,
He dims and blurs, he brings out to the eye
That *other* dread (writ, *then*, under restraint,
Invisible), *now* all too legibly!"

"'KNOWLEDGE SHALL INCREASE;' OR, THE POWER OF STEAM.

True plough of land and sea, with furrows wide
And deep thou ploughest either teeming breast
Of Earth, from north to south, from east to west,
For Knowledge, broadcast-sown, and vivified,
Each span of time, wind-shift, and turn of tide,
Draws rushing train its furrow without rest,
Ideal-real, of drill-machines all-best,
While Sail, Screw, Wheel, the azure plain divide.
Invisibly the network of Man's Thought,
With threads electric thrilling, meshes fine,
Shall all about his Planet-home be wrought.
Then to his Mind, thread on thread, line on line,
Imperial, central, one'd, shall all be brought,
All threads, thrills, pulses of the grand design.

ANDRE'S DRAUGHTSMAN'S HANDBOOK.

"The Draughtsman's Handbook of Plan and Map Drawing, including Instructions for the Preparation of Engineering, Architectural, and Mechanical Drawings." By GEORGE G. ANDRE, C.E., M.S.E. London: E. and F. N. Spon, 48, Charing Cross. 1874.

AT the present time there are a number of very excellent works bearing on the subject of mechanical and other drawing, and yet still room for more. There are also analogous subjects which run parallel therewith, which, in the case of an engineering student who may not have had the benefit of going through practical work in the shops, are necessary for him to become acquainted with by study, in order that instead of being a mere copier of drawings, he may be capable of working out the details of machinery. The author states the work is specially for draughtsmen engaged on topographical drawings, although his aim has been not to restrict it only to one class, and this, we think, is very well carried out, for the work may be consulted with advantage by those in any branch on which a draughtsman may be engaged. The book is divided into two parts—the first bearing on the essential elements in which the principles and practices of the art are clearly explained and illustrated, whilst in the second part the applications of the principles previously learned are treated, and also such information given as relates directly to the duties of practitioners.

To give a general idea as to these two parts we think it will be sufficient to state the headings of the sections into which the work is divided. In the first part, section 1 treats of the subject of the drawing office and its furnishings. This may seem a very trivial matter to dwell upon, but practical experience leads us to think the author has done good service by giving the advice contained in this section, which advice, if followed out in practice, would lessen complaints in drawing offices. Section 2 gives the elementary problems of geometry, and section 3 treats of lines, dots, and other combinations; the combinations bearing mainly on drawings of a topographical character, and the next sections (4 and 5) are a development of section 3 as regards colouring and shading. In part 2 the applications are gone into, but the applications of the essential elements are, in respect of sections 1 to 5, almost entirely devoted to the various delineations required in topographical drawings. Sections 6 and 7 bear respectively on mechanical and architectural drawings, and copying and reducing. The work is copiously illustrated with plates. To those engaged in any department of drawing we recommend the perusal of this work, but to those engaged on topographical drawing, to which the author has specially directed his efforts, it is especially valuable.

HEATH'S DOCTRINE OF ENERGY.

"An Elementary Exposition of the Doctrine of Energy." By D. D. Heath, M.A., formerly Fellow of Trinity College, Cambridge. London: Longman, Green, and Co. 1874.

We have read this work with pleasure, and have found a large amount of information put into a very concise form. The substance of it consists of lectures given by the author to the sixth form boys of a large public school, his "aim being to lay before the lads not a popular account of recent discoveries or theories, such as abound in periodicals and books for the young, but such an exhibition of the principles and methods of modern science, and of some results obtained therefrom, as might show them the use of mathematical ground-work in which they had been carefully instructed, and perhaps induce some of them to pursue their own scientific education "after leaving school." Such was the aim of the author, and we think he has successfully accomplished it; and, in order to illustrate his work, we will give one or two extracts, the first on "Impact of Perfectly Elastic Bodies." It states, when two masses (meeting one another with equal momenta) come in contact each resists the motion of, that is, exerts force on the other; and by the Third Law of Motion these forces, and the momenta they respectively produce in equal times, are equal and opposite. And therefore, the momenta being originally equal, both will be destroyed simultaneously, and the bodies come, simultaneously, *to rest*.

The forces which thus come into play, in fact, arise from a strain or distortion of the two masses, and may be represented by conceiving a spring—or two buffers, as between two railway carriages—interposed between them.

If, then, the spring, at the moment of rest, becomes *set*, or broken, there will be no rebound, and all energy of motion will have disappeared. If, on the contrary, the spring be *perfect*, it will now expand again, driving back each mass with the same force, at each stage, with which it resisted the compression; and so they will finally part each with the same momentum which it had before impact, only in the opposite direction; and so the energy of motion which had been momentarily annihilated, when the spring was at its greatest compression, will have been completely restored when the spring is completely unbent. The forces concerned in the compression and re-expansion are varying forces; but otherwise the case as to each mass is exactly analogous to that of the motion of a mass thrown upwards, having its motion first completely destroyed by doing work against gravity, and then completely restored by falling down again through a distance equal to that by which it rose.

Bodies whose behaviour is of the first kind are called "perfectly inelastic," while those of the second kind are usually described as "perfectly elastic." Both classes are ideal, like perfectly smooth surfaces; but lead and putty are fair approximations to the first class, and glass and ivory to the other. In nature, we may say that the spring is always more or less weakened, and so the rebound somewhat less than the compression, and some motion lost. We here confine our attention to the case of perfect elasticity.

In the last section of this work the various molecular theories are dealt with in concise terms. As an example we give a short quotation of the author's on this subject.

That in the solid state the particles of a substance exert force on each other, is almost too clear to need pointing out; their presence both prevents and causes motion in their neighbours. If we pull the two ends of a stick in opposite ways, the *cohesion* of the parts prevents anything more than (usually) a very small expansion and separation to take place; if we only apply the force at one end, that same cohesion (that is, attraction) pulls the other end after it. And so, when we push instead of pulling, a slight compression is the utmost we can produce. Only, in such case, if the forces applied be very great, we may overcome the internal ones, and break or crush the stick.

In the case of liquids, the force which the particles of a homogeneous substance exert is only, or chiefly, sensible at the surface. The cohesion of water is proved by its gathering in drops on cabbage-leaves, or hanging from roof-eaves, or momentarily maintaining itself as bubbles, &c. In all these instances the force of gravity tends to bring the whole mass down to the lowest level; and the force of cohesion (aided in the case of eavesdrops by a farther attraction between the water and the roof to which it clings) prevents the motion. No doubt the same forces are acting between neighbouring particles in the interior of the fluid; but, as there is the same force acting on all sides round each particle there, they do not produce the like sensible effect in causing or preventing motion.

Our space does not permit making further quotations from the work, but to those who desire a work treating correctly and concisely the subject of energy we cannot do better than recommend them this work.

WILSON'S DYNAMICS.

"Elementary Dynamics," with Numerous Examples. By W. G. Wilson, M.A., L.C.E., Presidency College, Calcutta: Thacker, Spink, and Co., Calcutta.

The title of this little work, when taken in the generally accepted sense, would seem to convey that it is restricted to one part only of the science of theoretical mechanics, but this is not so, for, according to the author of this work, the term dynamics he uses in its true logical sense as the science which treats of the action of force on matter whether it maintains relative rest or produces acceleration of relative motion, and dynamics is thus subordinated into statics and kinetics; so, therefore, we have in this work the whole of the subject comprised under the term "mechanics." The work differs in some respects from the text-books already in use, and whether these alterations are such as to render the work more serviceable to students than those on the principles ordinarily adopted is a question we must leave them to decide; though as a whole we think the author has produced a work which deserves their careful attention, and, perusal. One point is specially worthy of remark, namely, the fact that the author has successfully overcome the great difficulties attendant on printing the work in India, for the general get up of the work is quite as good as some of the works issuing in London.

SAFE USE OF STEAM.

"The Safe Use of Steam," containing Rules for the Guidance of Unprofessional Steam Users. By an Engineer. London: Lockwood and Co., 7, Stationers'-hall-court, Ludgate-hill. 1874.

The author of this little book has given, in concise terms, the various rules and regulations for the guidance of unprofessional steam users. We quite agree with his remark, "that the frequency of steam boiler explosions, with their appalling results, testify not only to the recklessness and inattention of those in charge, but also to the existence of great ignorance of the proper control of steam power." Thus he very properly makes it his special endeavour to add to the safeguards against such accidents, by giving to the steam user himself such a knowledge of the safe and economical working of steam boilers, as will be his best insurance against the ignorance of those whom he may employ. We can truly say that we consider this little work may be consulted with advantage by those to whom it is specially addressed.

SIR J. LUBBOCK ON CIVILISATION.

"The Origin of Civilisation and the Primitive Condition of Man (Mental and Social Condition of Savages). By Sir John Lubbock, M.P., F.R.S., &c. Third Edition, with numerous additions. Longmans, Green, and Co. 1875.

This is a new and improved edition of a most interesting work of anthropological research, in which the subject-matter is treated as might be expected (seeing it proceeds from the pen of Sir John Lubbock), in a style attractive to the general reader. This being a third edition, therefore a work not altogether new (and most probably one of a progressive series of editions), we cannot do more than heartily commend it to our readers.

CASSELL'S PUBLICATIONS.

We notice the following new serial publications, recently commenced by this enterprising firm. As we have received only the first numbers, all we can say is, that they promise to be worthy of the reputation of this firm. The works we have received are —"Little Folks" (a magazine for young children), Cassell's "Illustrated History of the United States of America," Cassell's "Family Magazine," Cassell's "Arabian Nights," Cassell's "Illustrated Shakespeare."

RAILWAY SIGNALS,

"A New Method of Signalling on Railways," Invented and Patented by Sir David Salomons, Bart. Southborough: A. K. Baldwin.

We are reluctantly compelled to defer our review of this interesting pamphlet.

PATENT LAW REFORM.

Deputation to the Lord Chancellor.

On Monday afternoon, December 14th, a deputation, consisting of the leading members of the Inventors' Institute, and other gentlemen interested in the subject of Patent Law Reform, had an interview with the Lord Chancellor, in his court, Lincoln's Inn. Among the gentlemen composing the deputation were—Sir Antonio Brady, the President of the Inventors' Institute; Mr. F. W. Campin, barrister-at-law, Secretary of the Institute; Mr. Hinde Palmer, Q.C.; Mr. James Howard, late M.P. for Bedford; Captain J. H. Selwyn, R.N.; Messrs. C. G. Carttar, Henry Hand, John C. Peacock, H. J. Surmon, Marshall M. Harris, Thomas Paterson, Samuel Howard, John Lancaster, Peter Love, Frederick H. Varley, George Savage, T. Morgan, John Ford, Henry Broadhurst, T. Blanchett, A. J. Murray, Newton Wilson, Dr. J. Macgregor Croft, Messrs. H. C. Coulthard, Samuel Calley. The Lord Chancellor was accompanied by Mr. B. Woodcroft, F.R.S., Clerk to the Commissioners of Patents; Colonel Stuart Wortley, Curator of the Patent Office Museum; and Mr. Thomas Webster, Q.C.; H. D. Jencken and T. R. Bailey (Hon. International secretaries of Association for the Reform and Codification of the Laws of Nations. Mr. Lister and several gentlemen connected with Patent business were present.

Sir Antonio Brady introduced the deputation, and explained that the object of their visit was to ask the noble and learned lord's assistance in obtaining an amendment in the Patent Laws. He believed that to the inventors, and to the country at large, the most satisfactory basis of amendment was the American Patent Law which had been found to work well, not alone in fostering the inventive genius of the United States, but in realising a sufficient revenue to defray the whole of the incidental expenses. The cheapening of the cost of patents was one great object of the deputation, that being especially necessary for the poorer inventors who were in the majority, such, for instance, as the working class inventor. Another thing in the American system which they held to be desirable, was the establishment of a public department, under a high official, to institute a preliminary examination into all applications for patents, so as to ascertain whether the supposed invention was new, and fairly patentable. The deputation hoped that the American system might be even improved upon, and that after a time patents might under certain circumstances be indefeasible. Hitherto in this country a patent had been nothing more than a license to go to law. The American system was something better than this. The first point was, that a staff of examiners should be appointed under Government, so that inventors should have confidence that the products of their labours would receive proper attention and just recognition. A museum of patents was a great feature in the American system. He thought that with the exception of the great legislative building at Washington, there were few, if any, public buildings of equal beauty and extent to that of the Patent Office of America. It was a building on which the Americans justly prided themselves. The deputation would like very much to see the example America has set in this respect followed by us. They thought that such an establishment would be found of great use in the extension and development of techical education in England. And they believed that the Anglo-Saxon race was equal to any people in the world, and that England, though a small country, would be able to hold her own in the way of manufactures and sciences provided she had a fair start in the race of competition. There was no danger in losing their position in this respect if proper means of technical education were provided. Some time ago he was one of a deputation that brought before his lordship's predecessors the case of the Patent Museum at South Kensington. That noble and learned lord displayed a good deal of interest in the matter, and they were then led to believe that they would ere long have in this country a building for the technical instruction of future generations, as well as for the advancement of art. Sir Antonio Brady concluded by requesting his lordship's permission for the Secretary of the Institute to read a memorial which the deputation desired to present, and he handed in a copy of the Patent Laws of the United States, and a copy of a pamphlet on the rules and practice of the United States in respect to patents. These documents would fully inform his lordship of the views of the Inventors' Institute, and the working of the American law.

Mr. F. W. Campin, Secretary of the Institute, then read the following memorial—

To the Right Honourable the Lord Cairns,
Lord High Chancellor of Great Britain,
&c., &c , &c.

Humble Memorial of the Inventors of Great Britain and Ireland, represented by the Inventors' Institute.

Sheweth,—

That the present unsatisfactory state of the Patent Laws renders it, in the judgment of your memorialists, absolutely necessary that a considerable amendment of those laws should be at once effected.

That no system of Patent Law appears to be better adapted to meet the requirements, either of inventors or the public, than that in operation in the United States of America. in which the following important points are provided for.

(*a.*) Cheapness in the cost of obtaining patents.

(*b.*) Provisions for a searching system of preliminary examination of the invention by a permanent staff of examiners.

(*c.*) Extension of time for which patents are granted.

(*d.*) A large and efficient organization as a separate department under a high official directly responsible to the representatives of the nation, and having well arranged museums and offices where information on the subject of inventions and patents can be obtained by the public.

Signed on behalf of the memorialists,
A. Brady, Knt., President,
F. W. Campin, Secretary,
Inventors' Institute.

With regard to this memorial, he thought it would be right to inform his lordship that it was not until after communication with many leading inventors, and much consideration on the subject, that they decided upon selecting the American law as a basis to act upon, and although the Institute had prepared the draft of a Bill incorporating that system in an amended patent law for this country, they preferred not to embarass his lordship by pressing it upon his attention just now. There were one or two points, however, in the American system which they should object to. One was that which obliged an inventor who applied for a patent to send in a model of his invention. That would be in some instances a very great burthen upon inventors. In many cases it would throw on the inventor the expense of a hundred pounds. It would be an injury to inventors more than anything else. Therefore some change should be made on that head. But there were many other provisions in the American law which his lordship would find to be very useful, and of great advantage to the inventors

Mr. Hinde Palmer, Q.C., who had been a member of the committee of the House of Commons which inquired into the working of the Patent Laws in 1871 and 1872, reminded his lordship that that committee came to the conclusion that the present Patent Law was objectional in many respects, and though they did not go so far as to recommend the adoption of the American system, they thought that a provision should be made for a satisfactory preliminary examination. There was an agreement that there were a great many advantages in the American system. To secure a satisfactory examination there must be, no doubt, an efficient staff.

The Lord Chancellor—I am afraid that the proposal of a large staff would cause some alarm in this country.

Mr. H. Palmer went on to say that the committee of 1872 found that the number of patents taken out yearly in America was much larger than the number taken out in this country. This was to be attributed to the encouragement given to inventors. The number of applications for patents in one year in this country recently was, it appeared, about 3,000.

The Lord Chancellor — About five thousand, and the number in America eighteen thousand.

Mr. Hinde Palmer continued: It was recommended that the preliminary examinations should be entrusted to three scientific gentlemen versed in such matters. That recommendation was sent to the Master of the Rolls of that time, but it came to nothing, as no provision had been made for remunerating them. Therefore there were no means of carrying out that recommendation; but the principle remained intact, that it was desirable such persons should be appointed. The committee of the House of Commons recommended the cheapening of patents, but nothing had been as yet done in that respect. It cost only 35 dols., or £7 to take out a patent in America, whilst in this country it costs something like £125 to take out a patent for fourteen years.

The Lord Chancellor was understood to say that he thought the cost in this country was smaller than what had been mentioned.

Mr. H. Palmer—The first step alone in this country costs £25. There were five successive stages, £5 each, for the payment of this £25. So that it came to this: the inventor in this country had first of all to pay within a very short time £25, and he had to pay altogether more than £125 before the completion of the term of his patent. These heavy charges operated very hardly against poor inventors; such, for instance, as those who belonged to the working classes. If his lordship could see his way to diminishing the cost of, and facilitating the first step towards, the taking out of a patent, he would do one thing which the deputation very much desired. He (Mr. Palmer) believed that a great many of the recommendations of the committee would be carried out if a properly constituted Patent Commission were appointed. His lordship would be surprised if he compared the recommendations of the committee with the provisions of the existing law. He quite agreed, speaking for himself, that there should be an obligation on the part of patentees to grant licences on fair terms for the use of their inventions. This would meet the objection raised by Lord Selborne while he was Sir Roundell Palmer in the House of Commons to what was called the obstructive nature of patents. (Note—this statement is not endorsed by the Inventors' Institute.)

The Lord Chancellor—Have you considered how the terms of a compulsory licence might be settled?

Mr. H. Palmer replied that the committee of the House of Commons recommended that such matters should be referred to proper commissioners for governing the Patent Office.

Mr. J. Howard (late M.P. for Bedford) remarked that those who objected to the Patent Laws on the ground of their obstructive character overlooked the fact that patentees took nothing from the public, but merely offered them something new. Considerable prominence had of late been given to the American system of patents. He was much struck when taking out a patent in America with the superiority of the American system to ours. In his specification there were four claims, and the American commissioners went very carefully into them all. They pointed out that in two of the claims he had been wholly and in one of them partially anticipated. He convinced them that in two of the particulars they were mistaken, and the result was that after he amended two of the claims three stood and one was rejected. Instead, therefore, of having a patent which was taken out in the dark, he had a good valid patent. As regards the expense of patents in this country he thought his honourable friend had understated it. His experience was that the preliminary cost was more like £50 or £60 than £25.

The **Lord Chancellor**—You mean to say that is the amount of the needful preliminary fees; of course, private expenses may vary according to circumstances.

Mr. **Howard** was understood to reply affirmatively.

Captain **Selwyn**, R.N., said the deputation desired the proposed change in the law, not in the interest of English inventors alone, but in the interest of the whole nation. We had arrived at a period in the history of this country when we must hold out a greater amount of protection to the efforts of its inventive genius. This was particularly necessary for the encouragement and the development of skilled labour and invention among the working classes. There were representatives of working men men on this deputation. They said that under the existing law there was no use in their endeavouring to produce inventions when they could not afford to pay for their protection. Surely this was not right. The deputation, therefore, urged strongly that the working man should be able to take out a patent with as little cost and trouble as possible. They did not know how that could be done except by the adoption of the American law, but they believed that if the fees were smaller there would be a great many more inventions brought into public use than there were at present. With regard to compulsory licenses he had yet to learn that any inventor ever refused to grant a license for his invention on being offered a fair remuneration. The law should certainly deal as tenderly with the rights of inventors as it did with railway or any other kind of property. This matter they were, however, disposed to leave in the hands of the House of Commons or of his lordship. The American law had been found to work well, and a thing already proved was better than many theories.

Mr. **Paterson**, a working cabinet maker, said that he had had a good deal of communication with inventors of the poorer class, and he could fully endorse all that had been said respecting the advisability and the necessity of reducing the fees in connection with the taking out of patents. Working men were in the habit of saying that when they proved their title to an invention they were unable to make use of it, or to turn it to any profitable account for want of money. He thought there could be no question that the law should protect their right to property in their inventions. These poor men naturally considered themselves badly treated in not being able to take full advantage of any improvement they might invent. He knew of cases in which working men were positively cheated out of their inventions under the existing system. In one case with which he became officially acquainted when connected with a working man's exhibition, a man's invention was made use of without his consent by persons who made a couple of thousand pounds by it. A protection was obtained by special Act of Parliament for the invention during the time the exhibition was fixed to remain open, but the exhibition remained open a month longer than was intended; and, as there was no protection then, the invention was pirated. With regard to the committee referred to by Mr. Hinde Palmer, it should be recollected that no person representing the poor class of inventors was called upon to give evidence. The committee had not before them any one man who could speak from positive experience of the disadvantages under which the poorer class of inventors laboured—a class of persons whose observations and capabilities of improving upon what they daily saw were of immense importance to the machinery resources of this country. He believed that all this was a great source of dissatisfaction among, not only those who took an interest in inventions, but the working classes at large, as when a number of intelligent working men began to think that they were being unduly kept down, their dissatisfaction was sure to spread among all others of their class with whom they came into contact; so that really it was for the public peace that some change should be made in the law.

Mr. H. D. **Jencken**, one of the Honorary International Secretaries of the Association for the Reform and Codification of the Laws of Nations, stated that complaints had come from every part of the Continent of Europe respecting the existing Patent Laws. One of the principal of the complaints was that there was an inequality in the charges for patents, and that the charges in England were enormous. Indeed, when foreigners came to think over the English system, they did not know where they were, so puzzled did they become. They were surprised to find that there was no preliminary examination of patents in England. As an instance of the necessity of some change in the law, and of some international understanding, he could cite cases in which persons who had been unsuccessful on the Continent in getting patents, coming to this country and getting them readily, simply because there was an examination on the Continent, and there was no such system here. Such persons as these, after getting their English patents, went back to the Continent, and turned them to good account as patented articles. He urged a similarity of the Patent Laws of this country and of those on the Continent as a very important and useful improvement.

Mr. S. E. **Lister**, of Bradford, addressed his lordship on behalf of the United Chambers of Commerce of England. He called to mind that, in consequence of what occurred at the Vienna Congress last spring, a proposition was brought before the Chambers of Commerce which he represented, affirming the decision of the Vienna Conferences. The decision was that a similarity in the Patent Laws of all countries was advisable. He believed, with the Inventors' Institute, that the adoption by this country of the American system would settle the whole matter on a satisfactory basis. If that were done he was satisfied that all difficulties with other countries would cease.

Mr. **Webster**, Q.C., one of the commissioners at the Vienna Congress for the English Government, presented his report of the proceedings in the shape of a blue-book, which has been just published, to Lord Cairns. The learned gentleman stated that the American and the English systems were fully considered at the Congress. There was a strong feeling among the members of the Congress that the preliminary examination system was essential. They attached much importance to the cheapening of patents, but first of all in importance was the preliminary examination. There was no question at all as to the value of the American system. There was a difference of opinion as to the question of licenses, but it was believed that the Commission of Patents might very easily come to a decision on that point. His lordship would find a scheme suggested at page 390 of the blue-book with which he had been just presented. There would be no difficulty with regard to money, as there was now £1,000,000 belonging to inventors.

The **Lord Chancellor**—Has the million been set apart? (A laugh.)

Mr. **Webster** feared that it had not.

Mr. **Peacock** remarked that in addition to those large fees, a person would lose his patent altogether if he did not take it up by a certain hour on a certain day.

The **Lord Chancellor**—I must disagree with this assertion.

Mr. **Peacock** was always under the impression that if an inventor did not present his patent on a certain day he forfeited it.

The **Lord Chancellor**—That is so.

Mr. **Peacock** suggested that instead of an inventor losing his patent on such an occasion he should only be fined.

Sir **Antonio Brady**, interposing, suggested that these were only matters of detail, with which perhaps it would not be well to detain his lordship.

The **Lord Chancellor**—I can assure you, gentlemen, that I have received you with pleasure, and listened to what you have said with great interest. The subject of patents is one which has anxiously engaged my attention for some time past. I am only too glad to have opened communications with you, and I have to thank you for having expressed your opinions before me, and for the documents you have placed in my hands. I am sure that you will not expect me to say any more just now than that if the Government will not be able to do all that you want, they will, at all events, be enabled to place the Patent Laws of the country on a better footing than they are at the present moment.

Sir **Antonio Brady** then tendered the thanks of the deputation to the Lord Chancellor for the kindness of his reception and interest he had displayed in the subject; after which the deputation withdrew.

THE RIGHT HON. W. E. FORSTER, M.P., ON PATENT LAW AMENDMENT.

This gentleman, speaking at the soiree of the Bradford Chamber of Commerce recently held, made the following pertinent observations on the above subject:—The Americans were known to be a most inventive people, and it was exceedingly desirable that we should come to some agreement with them on such a question as the Patent Laws. (Hear, hear.) It was stated in the report—and to a great extent he agreed with it—that what England and America agreed upon in this matter would be adopted by other countries. Without disparaging our Continental friends, it was impossible to deny that the great majority of inventions came from this country, or from the other side of the Atlantic, and he could not help thinking that the industrial gathering next year might afford an opportunity for a discussion of the question which might result in the Governments of both countries being convinced that advantage would be derived from co-operation and unity. (Cheers.) He advised any person who went from Bradford to Philadelphia to see the Patent Museum there, as it was one of the finest buildings in the world.

Mrs. Henry Wood writes to a contemporary as follows:—"As it is being rather widely asserted that I am the author of the novel, 'In the Dead of Night,' and as there is not a shadow of foundation for the assertion, will you kindly allow me a very small space in your journal to put the matter right? I am not the author of 'In the Dead of Night.' I never saw the work until it was in print. I am not even personally acquainted with the gentleman who did write it."

TEULON'S "COUNTER-THRUST" ROTARY ENGINE.

It has long been recognised that the actual effective power exerted by a screw-propeller engine in the propulsion of a ship falls disproportionately short of the power developed in the boilers and indicated in the working cylinders; and that this deficiency of useful effect exists under the most favourable experimental circumstances, as well as in everyday practice. The force expended in overcoming the inertia and friction of the moving parts of any machine is, of course, subtracted from the motive power, and must therefore be deducted from the useful effect; and the most perfect machine is that which abstracts the smallest proportion of motive powor for the maintenance of its own free motion, and passes on (so to speak) the largest surplus of power to be expended in work. This being so, it is evident that this recognised deficiency of duty in the work of a screw-engine, as compared with other engines, must be mainly due to the operation of some *abnormal* element of resistance, increasing its permanent load; and the element of resistance most demanding attention (because perhaps capable of elimination) is the friction arising from the reaction or "thrust" of the propeller.

The present arrangement of collars and thrust-blocks to receive the thrust, and prevent disarrangement of machinery, and other evils formerly incurred, though performing those duties very effectively, does but little actually to lessen the friction inseparable from axial rotative pressure (in *one* direction), but simply obliterates its destructive tendencies by subdividing the sum total of that pressure into fractional parts, and distributing it over multiple surfaces. The very form and arrangement of the thrust-bearings, their gradual detrition in working, and the indications of the dynamometer, all prove the existence of great friction, which constitutes a continual addition to the permanent load of the engine, and necessarily absorbs a large percentage of the motive power. Could some method be devised and put in practice for imparting to a propeller-shaft, simultaneously with its rotation, a thrust *equal and contrary* to that arising from the propulsive effort, the two opposed forces would be in equilibrio, the thrust-friction (inseparable from a thrust in *one* direction only) would cease to exist, and the engine, therefore, be free to work with greatly-increased advantage, giving a higher duty than before from the same consumption of fuel, or the same duty with decreased consumption. Such an object the invention of the "counter-thrust rotary engine," recently patented by Mr. G. A. Teulon, of Hampstead, is proposed to effect.

The simplest and earliest form of rotary steam-engine, known as Hero's, revolves by the simultaneous action and reaction due to jets of steam issuing from tangential orifices in radial tubes, supplied from a hollow axial shaft: the lines of effort—of these tangential jets—being all in the plane of rotation, the shaft simply rotates with the wheel, without any disturbance or lateral motion of the axis. But if all the orifices of such a wheel be turned diagonally (at 45 deg.) to one side of the plane of rotation (so that the issuing jets will be spirally parallel to each other) there will result, on admission of steam, an axial thrust of the central shaft in the *opposite* direction, simultaneously with its rapid rotation. The principles upon which this action depends are akin to, though not identical with, those of which Hale availed himself in the invention of his "rifled" (or more properly, self-rotating) rocket: in which the motive power, or gas, already employed in effecting the forward thrust, is made by impingement on diagonal passages in the rear of the rocket) to effect its rapid rotation: whereas, in the present instance, the method of imparting thrust is developed from means of rotation already possessed.

With this means of imparting axial thrust to a shaft, it becomes practicable to oppose or counteract the thrust of a screw-propeller on the same shaft, while effecting or aiding its rapid rotation, and at the same time neutralising most of the thrust-friction hitherto provided against as unavoidable. The effect being most readily obtained (and increased at will) by the use of high-pressure steam, it is advisable to employ the "counter-thrust" engine as the first or high-pressure member of a compound engine, by enclosing the thrust-wheel in a sheathed and steam-tight reservoir, from which the exhaust or low-pressure steam is continuously drawn to operate a direct-acting crank-engine, working upon the same shaft: thereby continually moderating the pressure in the reservoir, while utilising the remaining pressure of the steam, prior to its condensation.

The form of engine preferred, and best adapted by its arrangement, simplicity, and great working speed, to fill this place, is the three-cylinder engine of Messrs. Brotherhood and Hardingham; but to permit a more direct exhaustion from the reservoir, and to lessen the waste of steam in passages, the substitution of large slide-valves on the outer ends of the cylinders would in this case be advisable: these slide-valves would all be worked by a single eccentric, or cam. A duplicate set of tubes or passages in the thrust-wheel, with their diagonal orifices open to the sternward side of the plane of rotation, will serve, when put into action, to counteract the pull of the propeller in "going astern;" so that the counter-thrust can be directed either way as required, by a semi-rotary valve in the central steam-tube. To obviate the results of any possible *inequality* of strain between the propeller-thrust and the counter-thrust, a modified form of the common thrust-block is introduced; the lateral friction upon this, and its consequent wear, would evidently be slight in exact proportion to the equable co-adjustment of the two diverse (and more or less equilibrated) strains acting upon it. This co-adjustment would ordinarily be effected by the action of the governor (or still better, of the "pneumatic governor"), the counter-thrust maintaining a constant ratio with the rotary power, and, as that does, with the amount of steam admitted; but of all the arrangements for screw propulsion in use, Mr. E. J. Harland's system of deep immersion, combining as it does with other advantages a special *equability* of thrust, is the one best adapted for the beneficial operation of "counter-thrust." In conclusion, it may be observed that the application to many forms of *boring* machines of a motor arranged to combine continuous thrust or "self-feeding" with high rotary speed, would offer very obvious advantages.

The system of inclined screw-shaft (before alluded to) has the further benefit of giving scope for enlarging the thrust-wheel, without depressing its lower side towards the bilge.

In regard to the *rationale* of the invention Mr. Teulon states two probable objections to the theory of the above, as hereinbefore mentioned are—1st, the proved wastefulness of the *original* form of Hero's steam-wheel; 2nd, the disadvantage entailed by back-pressure in the reservoir. As to the first, Hero's steam-wheel was tried by an engineering firm in Scotland some twenty years since, with all the advantages of modern workmanship, high-pressure steam, and partial vacuum in the reservoir, but failed, notwithstanding its great rotary speed, to reach an efficiency at all nearly equal to that of a simple cylinder engine, using the same pressure and quantity of steam.

In studying the cause of this inefficiency, Mr. Teulon has found reason to believe it due to the fact of the forces being exerted *in* the plane of rotation, and therefore necessarily expended to a great extent merely in *keeping pace with* the acquired speed of the wheel's periphery—a disadvantage analogous to that (lately much commented upon) which attends the operation of a paddle-wheel in a swift backward current; where the speed of the power exerted at the periphery of the wheel must continually *tend to exceed* the speed of the current, in order to maintain its effective action thereon.

On applying to circular motion the theory of "the parallelogram of forces," it was found that this disadvantage could be eliminated from the steam-wheel by turning two jets of reaction diagonally at 45 deg. to *each* side of the plane of rotation; the *resultant* of their united action (*i.e.*, the continuous diagonal of the parallelogram of forces) being then in the plane of rotation, while the forces themselves—from their direction—act more independently of the rotary speed, and therefore to fuller advantage. The next step, that of closing the orifices on *one* side of the plane of rotation, disclosed the fact of the axial thrust; the existence of which, on a merely experimental scale, implies *a fortiori* its capacity of efficient development.

As to the second objection, that of the disadvantage of back-pressure in the reservoir, it is obvious the resistance to a plane disc revolving in a circular chamber, is wholly devoid of the element of *compression* inseparable from the action of a moving piston diminishing the contents of its cylinder; so that the back-pressure will only affect the action of the thrust-wheel by retarding the efflux of the steam jets. It has, however, been demonstrated by Mr. R. D. Napier's experiments in 1866, by Professor Rankine's articles in the *Engineer*, November 26th and December 3rd, 1869, and by Mr. G. Wilson's articles in *Engineering* during March, 1872, the velocity and reaction of an elastic fluid issuing from an orifice are independent of the pressure of the external medium, provided the latter be *below one half* the former pressure. This being so, it is obviously practicable so to proportion the size and steam-consumption of the low pressure engine to those of the high pressure, as to ensure and maintain the necessary difference between their two pressures.

A third possible objection, to the extent of radiating surface exposed by the arrangement shown, is met partly by the radial arrangement and close juxtaposition of the three cylinders to the reservoir, partly by the ordinary expedients of sheathing and lagging.

G. A. T.

[We understand the above will shortly form the subject of a paper for discussion at the Inventors' Institute.—Ed. S. R.]

USEFUL DENTIFRICE.

Dr. D. H. L. Hogg, of Texas, writes us that he has found liquor calcis (water and lime) vere useful as a mouth-wash. It improves the gums and prevents the toothache. He has used it in private practice and personally.—*Medical and Surgical Reporter*.

A handsomely illustrated edition of the poems of Sydney Dobell will be issued in two volumes early in the present year. The *Athenæum* gives a sample of the posthumous portion of the contents entitled "New Year's Eve"—

"As when at twelve o'clock strong January
Flings wide the gates of life and we look out
Straight to the primroses, and with the swallow
Skim thro' the dawns of daffodils and up
To bluebell skies, and from the bluebell skies,
Like a wild hawk upon a flight of doves,
Swoop upon June and Paradise, and on
Beyond the bounds of Eden to an Earth
Boss'd with great purples of new-clustered wine
Betwixt the tented harvests red and gold,
And so into a cloud, and know no more——"

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Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President of Council:

SIR ANTONIO BRADY.

MEMBERS MEETINGS AT 8 P.M.

Thursday, February 11, Patent Law Conference, specially as to compulsory licenses, and the limitation of the amount of Inventors' profits by law.

Thursday, February 25, Exposition of Inventions in Sewing Machinery.

Council and Executive Meetings on the same Evenings at 7 p.m

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

On 14th Jan., 1875, the council met *pro forma*, and confirmed the minutes of the last meeting. The Executive Committee proceeded to business, the chair being occupied by F. H. Varley, Esq., Vice-President of the Council. The Hon. Secretaries of the Dinner Committee having reported the state of the accounts of the dinner on November last, the treasurer was authorized to settle the account forthwith.

On 28th Jan., 1875, Council and Executive meetings held in pursuance of the notices in last month's Journal. Report of proceedings unavoidably deferred till our next.

The Members' Meeting on 14th January was a Patent Law Conference, Mr. F. H. Varley, V.P.C., presiding. The Secretary having referred to the deputation to the Lord Chancellor, and stated that since that date it had been announced in the public journals that it was intended to amalgamate the Designs Act with the Patent Law, which would introduce a new element into the Patent Law question, as the Utility Designs Act was in many cases resorted to by inventors,

Mr. NEWTON WILSON stated that he considered that if the Designs Act were swept away a sort of preliminary provisional protection, costing a few shillings only, ought to be established, affording the option of subsequent provisional protection and patent to meet the wants of inventors of the minor class of invention.

The desirability of having a short term as well as a long term patent was mooted. These views were supported Mr. G. SAVAGE, and a resolution in favour of such preliminary provisional protection was passed unanimously.

A discussion ensued on the subject of compulsory licenses, Mr. NEWTON WILSON absolutely, and Mr. H. PENDRED conditionally, advocating them, whilst the CHAIRMAN, Mr. A. J. MURRAY, Mr. MCLAUCHLAN, Mr. CALLEY, Mr. YATES, and others, opposed the system as very difficult to work, and fraught with many dangerous consequences. As much difference of opinion was expressed, it was suggested that a special discussion on this point should take place on an early day.

Monthly Notices.

The Sub-Wealden Exploration Committee has published a quarterly Report. All the attempts made by the Diamond Boring Company to remove the broken sod from the bore-hole have proved abortive, consequentcy no progress has been made. Prof. Gosselet, of Lille, we are told, has given his opinion, that the Boullonais Carboniferous Strata are admitted to belong to the true coal-measures, and he predicts that they will be found on this side of the Channel in the three southern counties. In the meantime, preparations are being made for working the gypsum discovered.

Dr. William Macdonald, Professor of Civil and Natural History in the United Colleges, St. Andrews, died on January the 1st. The Professor has occupied this chair for twenty-four years.

The small planets discovered by Palisa at Pola, near Trieste, on March 18, April 21, and October 13, last year, have received the names Austria, Meliboea, and Siwa, respectively. The only one still in want of a name is that discovered by Prof. Watson, in China, on October 10.

Some remarkable improvements made in his electrical machine Mr. Z. T. Gramme communicates to the Paris Academy of Sciences. His original machines ignited four inches of platinum wire. The improved machines will heat to redness sixteen inches of the same wire, without any increase in the weight of the materials, or in labour. This great increase in the intensity of the current is, for the most part, due to the new thin plate magnets of M. Janin. The electric light machine has been considerably reduced in size and greatly increased in power.

The Theories of Steam Boiler Explosions form the subject of an interesting paper in Dingler's "Polytechnic Journal," by Dr. F. Fischer. In it explosions from no less than eight different causes are examined with the most scrupulous care. The conclusion arrived at being "there is ground enough for the opinion that the formation of incrustations and boiler deposits is the worst enemy of steam industry."

Obituary.—We have to record the death of Thomas Ogden Dixon, of Croft House, Steeton, a member of the Inventors' Institute, who died December 22nd, 1874, in the 49th year of his age.

Lady Students at Cambridge.—Two students of Girton College have been examined in the natural science tripos. Miss Kingsland, daughter of the Rev. N. Kingsland, Congregational minister, Bradford, passed equal to second class, and has been appointed assistant lecturer in natural sciences and mathematics at Girton College. The other, Miss Dove, daughter of the Rev. J. Dove, vicar of Cowbitt, Lincolnshire, would have been entitled to the ordinary degree, and has been appointed to an assistant mistress-ship at Cheltenham Ladies' College, with a special view to teaching physiology. The ladies passed the *viva voce* examination, and also in physiology and chemistry.

The freezing of sea-water and various saline solutions have been the subject of experiments recently conducted by Professor Guthrie, who publishes the results in the *Philosophical Magazine.* Ordinary brine, upon being sufficiently reduced in temperature, ice separates, and the brine becomes richer in salt. The solution, upon being saturated, crystals of a bihydrate of chloride of sodium are formed, and their separation necessarily impoverishes the brine. When this impoverished brine is further cooled, by contact with solid carbonic acid and ether, the whole solidifies, the water and salt forming a homogeneous crystalline mass of definite composition, which is probably a hydrate, containing ten molecules of water. The term Cryohydrates is provisionally proposed for the newly-discovered class of bodies, of which this compound is a type; a class of bodies, in fact, which contain water combined with various salts, and which solidify below the freezing-point of water. In the freezing of sea-water, ice is first formed; but it is probable that the remaining brine may be so enriched as to throw out, on continued cooling, some of these cryohydrates. Professor Guthrie concludes that the degree of saltness of an ice-floe will depend not only on its age, as Dr. Rae had already observed, but also on the rapidity with which it is first formed, and on the lowest temperature to which it has afterwards been submitted.

The Death of Canon Kingsley has just been announced. By his decease we lose a great intellect and an example of rare honesty.

Purification of Spirits.—Mr. M. M. Harris, the patentee of an American process of rectifying whiskey and other spirits by distillation *in vacuo*, recently exhibited it in operation at his works, York-road, Camden Town. Sir Antonio Brady, Mr. Jeffreys (an eminent medical practitioner of the district), Mr. Varley, Mr. F. W. Campin, Mr. C. G. Carttar, Mr. Walton, and other gentlemen were present, and expressed themselves fully satisfied with the results of the operations performed. A principal object of the system is to eliminate the pernicious fusel oil contained in spirits.

The St. James's Magazine.—It is announced that Mr. S. R. Townshend Mayer has been appointed editor of this magazine; and that under the new management arrangements have been made for contributions from many well known writers, including Edward Jenkins, M.P., author of "Ginx's Baby;" the Rev. D. Hayman, late Head Master of Rugby; Justin McCarthy, R. H. Horne, Mortimer Collins, John Watson Dalby, Dr. E. J. Lyson, and others of equal eminence.

Pulvermacher's Improved Galvanic Apparatus.—This consists in a chain battery of ingenious construction, which gives off electricity at very high tension, and certainly nothing could be better adapted for facilitating the application of electricity to the human body without much difficulty.

Mr. Thicke, the architect, has, we understand, a new system of constructing working men's dwellings, and he is about to form a new and promising building society for carrying on the erection and disposal of such dwellings.

LITERARY ANNOUNCEMENTS.

AN official history of the Ashantee Campaign is to be published.

The first article in *Fraser's Magazine* for January, comprising seven chapters of an historical sketch of the "Early Kings of Norway," is from the pen of Mr. Thomas Carlyle.

Mr. Murray promises for the ensuing season a new book by Mr. Darwin, called "Insectivorous and Climbing Plants."

Mr. Murray's list contains, "The Caucasus, Persia, and Turkey in Asia, being a journey through the Caucasus to Tabreez, Kurdistan, down the Tigris and Euphrates to Nineveh and Babylon, and across the Desert to Palmyra," by Baron Max Von Thielmann, translated from the German by Mr. C. Heneage; "The Land of the North Wind, or Travels among the Laplanders and Samoyedes, and along the shores of the White Sea," by Mr. Edward Rae; and "The Hawaiian Archipelago, Six Months among the Palm-Groves, Coral-Reefs, and Volcanoes of the Sandwich Islands," by Isabella Bird; "Old Times and Distant Places," a series of sketches, by Archdeacon Sinclair; "The Life of Titian," by Messrs. Crowe and Cavalcaselle; the third volume of Mr. Elvin's edition of "Pope's Poetical Works;" and the fifth volume of "The Speaker's Commentary," containing Isaiah, by Dr. Kay, and Jeremiah, by Dr. Payne Smith. The first volume (A to J) of the "Dictionary of Christian Antiquities," edited by Dr. W. Smith and Rev. Prof. Cheetham, M.A., is promised in February. The work commences at the point at which the Dictionary of the Bible leaves off, and gives an account of the Institutions of the Christian Church, from the time of the Apostles to the age of Charlemagne.

Proceedings of Societies.

ROYAL SOCIETY.

DECEMBER 10TH.—Dr. Hooker, C.B., President, in the chair.—The following papers were read: "The Development of the Teeth of the Newt, Frog, Slowworm, and Green Lizard,"—"On the Structure and Development of the Teeth of the Ophidia," by Mr. C. S. Tomes,—"On the Effect of Heat on Iodide of Silver,"—"On the Co-efficient of Expansion of a Paraffine of High-boiling Point," by Mr. G. F. Rodwell,—"Experiments showing the Paramagnetic Condition of Arterial Blood as compared with the Diamagnetic Condition of Venous Blood," by Dr. Shettle,—and "On the Multiplication of Definite Integrals," by Mr. W. H. L. Russell.

January 7th.—Dr. Hosker, C.B., President, in the chair.—The following papers were read:—"Remarks on a New Map of the Solar Spectrum," by Mr. J. N. Lockyer; "On the Spectrum of Coggia's Comet," by Mr. W. Huggins; and "On Acoustic Reversibility," by Dr. Tyndall.

January 14th.—Dr. Hooker, C.B., President, in the chair.—The following papers were read:—"On a Class of Identical Relations in the Theory of Elliptic Functions," by Mr. J. W. L. Glaisher; and "On Some Remarkable Changes produced in Iron and Steel by the Action of Hydrogen and Acids," by Mr. W. J. Johnson.

ENTOMOLOGICAL SOCIETY.

DECEMBER 7TH.—Sir S. S. Saunders, President, in the chair.—Lieut. H. C. Harford, Messrs. C. C. Dupré and O. Wilson, were elected Members; and Major Greenwood, a Subscriber to the Society.—Mr. E. A. Fitch exhibited some Oak Galls formed by insects of the genera Dryocosmus and Aphilothrix, of which descriptions had been published in a recent number of the *Entomologist's Monthly Magazine*, together with three curious bud-galls, unknown, from Rayleigh, in Essex.—Mr. Champion exhibited a box of Hemiptera, collected by Mr. J. J. Walker in different places near the Mediterranean.—Prof. Westwood forwarded a letter he had received from Mr. H. Stone, accompanying a sample of tea imported from Shanghae, infested by a small beetle, which proved to be the *Pitnus hololeucus*. Also a letter from Prof. Forel, of Lausanne, stating that the *Phylloxera vastatrix* had made its appearance among some vines at Pregny, in the canton of Geneva, which had been introduced from England into the graperies of the Baron Rothschild, and that the Phylloxera had been discovered in two of his greenhouses among vines planted in 1869, sufficiently distant from each other to render it improbable that the insect could have passed from one to the other; and he therefore concluded that the disease had been introduced in 1869 from the graperies in England. He was anxious to ascertain whether the vines in the English graperies were less influenced than those out of doors; but none of the members present were aware of the occurrence of the insect out of doors; it had hitherto appeared in greenhouses only.—Mr. C. O. Waterhouse communicated some "Synonymical Notes on Longicorn Coleoptera."

CHEMICAL SOCIETY.

DECEMBER 17TH.—Prof. Gladstone, V.P., in the chair.—A paper "On Groves's Method of preparing Chlorides," by Dr. Schorlemmer, was read. The author finds that the process does not answer well for the higher primary alcohols, although the secondary chlorides can readily be prepared by it.—The other papers were, "On the Precipitation of Metals by Zinc," by Mr. J. L. Davies,—"Researches on the Paraffins existing in Pennsylvanian Petroleum," by Mr. T. M. Morgan,—"Some Remarks on the Preceding Paper," by Dr. Schorlemmer,—and "A Note on Aricine," by Mr. D. Howard, who finds that this is really a distinct alkaloid existing in certain kinds of cinchona barks.

MATHEMATICAL SOCIETY.

DECEMBER 10TH.—Prof. H. J. S. Smith, President, in the chair.—The earlier part of the meeting was made special, and the following changes were, after discussion, made in the Society's rules, viz.:—"That in future there shall be an entrance fee of one guinea, and that the life composition shall be ten guineas." Rule 36 was ordered to be cancelled.—Mr. W. D. Niven was admitted into the Society; Messrs. H. Hart and E. J. Nanson were elected Members; and the following gentlemen were proposed for election: Messrs. J. W. Russell, C. M. Leudesdorf, E. B. Elliott, H. M. Jeffery, C. Smith, and B. Williamson.—The Chairman, on the recommendation of the Council, nominated Drs. Klein, Kronecker, and Zeuthen for the honour of Foreign Membership.—Prof. Cayley read his paper "On the Potentials of Polygons and Polyhedra."—Mr. Tucker gave a sketch of the contents of two letters from M. Mannheim to Mr. J. J. Sylvester, "On Three and Seven Bar Motion."

GEOLOGICAL SOCIETY.

DEC. 16TH.—J. Evans, Esq., President, in the chair. Messrs. T. Warburton, W. Watts, J. G. Grenfell, T. K. Callard, J. Slade, H. Stoyes, J. Gibson, R. H. Traquair, M.D., and R. F. Cunningham, M.D., were elected as Fellows. The following communications were read: "Descriptions of the Graptolites of the Arenig and Llandeilo Rocks of St. David's,' by Messrs. J. Hopkinson and C. Lapworth, and "On the Age and Correlation of the Plant-bearing Series of India, and the Former Existence of an Indo-Oceanic Continent," by Mr. H. F. Blanford.

METEOROLOGIGAL SOCIETY.

DEC. 16TH.—Dr. R. J. Mann, President, in the chair.—Mr. W. C. Punnett and the Rev. G. T. Ryves were elected fellows. The names of eighteen candidates for admission into the society were announced. The following papers were read:—"Atmospheric Pressure and Rainfall," by Mr. J. C. Bloxam,—"Remarks on West India Cyclones," by Mr. H. F. Jahneke; this is in continuation of a former paper read before the society in February last,—"Notes on the Weather experienced over the British Isles and the North-West of France during the first few days of October, 1874," by Mr. R. H. Scott; the object of this paper was to show that the charts given in the *Bulletin International* are drawn upon insufficient data, and consequently are not always correct: the author also proposed the adoption of the conical projection on charts for meteorological purposes,—"On a new Self-registering Hygrometer," by Messrs. Negretti and Zambra,—"Results of Meteorological Observations made at, and near, St. Paul's Island, in the South Indian Ocean," by Mr. R. H. Scott; these results had been worked out for the information of the French expedition to that Island for observing the Transit of Venus,—"Description of a new Patent Portable Magnetic Anemometer and Current Meter for Maritime Use," by Mr. R. M. Lowne.

ANTHROPOLOGICAL SOCIETY.

DEC. 22ND.—Prof. Busk, President, in the chair.—Mr. G. Lambert and Mr. J. Harte were elected members.—Mr. J. P. Harrison exhibited tracings of late Phœnician characters from the south-west of Sumatra. They differed entirely from early letters in other parts of the island. The natives had a tradition that some descendants of Alexander settled here, and if Nearchus's second expedition, the account of which is lost, reached the Bay of Bengal, the date, Mr. Harrison considered, would agree sufficiently well with the letters. Col. Lane Fox read a paper "On Early Modes of Navigation," in which he described the various contrivances employed by savage races for transit on the water. Commencing with the simple trunk-canoe, the author traced the development of the art of the boat and ship building through the stages of stitched plank canoes, bark canoes, rafts, outrigger canoes (single and double), the double canoe, the variation of hull, the weather-platform, the rudder, and the rude sail, and gave the distribution of their many forms and modifications. It was argued that the rude bark-float of the Australian, the Tasmanian, and the Ethiopian, the catamaran of the Papuan, the dug-out canoe of the New Zealander, and the built-up canoe of the Samoan, were survivals, representing successive stages in the development of the art of ship-building, not lapses to ruder methods of construction, as the result of degradation; that each stage supplies us with examples of what, at one time, was the perfection of the art. Some of the more primitive kinds spread over nearly the whole world, whilst others had a more limited area of distribution.

ZOOLOGICAL SOCIETY.

JANUARY 5TH.—Dr. E. Hamilton, V.P., in the chair.—The secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, and called particular attention to a Campbell's monkey (*Cercopithecus campbelli*) purchased Dec. 15th, and two Hardwicke's Mastigures (*Uromastrix hardwickii*) from India, presented by Lt. Col. C. S. Sturt, 23rd December. A letter was read from Dr. George Bennett, of Sydney, F.Z.S., giving an account of an Indian Beetle (*Chrysochroa ocellata*), which had been captured alive in the Bay of Bengal, 273 miles from the nearest land, by Captain Payne, of the barque *William Mansonn*. A letter was read from Mr. Anderson, F.Z.S., of Futteyghur, E.I., giving an account of the eggs and young of the Gharial (*Gavialis gangeticas.*) The secretary read a letter addressed to him by the Marquis of Normanby, Governor of Queensland, announcing that he had forwarded by the ship *Ramsay*, under the care of Captain Caven, a fine specimen of the Australian Cassowary, (*Casuarius australis*) as a present for the society's collection. A communication was read from Mr. A. G. Butler, giving descriptions of thirty-three new species of *Sphingidæ* in the collection of the British Museum. A communication was read from Mr. Andrew Anderson, F.Z.S., of Futteyghur, giving corrections of and additions to a previous paper by him "On the Raptorial Birds of North Western India." (P.Z.S., 1872, page 619). A communication was read from Mr. E. L. Layard, F.Z.S., H.B.M. Consul for Fiji and Tonga, containing "Ornithological Notes made in the Fijis," together with descriptions of some supposed new species of birds.

INSTITUTION OF CIVIL ENGINEERS.

DECEMBER 15TH.—Mr. T. E. Harrison, President, in the chair.—The papers read were, "On the New South Breakwater at Aberdeen," by Mr. W. D. Cay,—and "On the Extension of the South Jetty at Kustendjie, Turkey," by Mr. G. L. Roff.

The Fifty-seventh Annual Meeting "to receive and deliberate upon the Report of the Council on the state of the Institution, and to elect the officers for the ensuing year," was held on Tuesday evening, the 22nd of December, 1874, Mr. Thos. E. Harrison, the President, being in the Chair. After the reading of the report, the premiums that had been awarded for papers read at the ordinary meetings were presented as follows: Telford Medals and Premiums to Bindon Blood Stoney, M.A., Richard Christopher Rapier, and Joseph Prestwich, F.R.S.; Watt Medals and Telford Premiums to Alexander Carnegie Kirk and George Wightwick Rendel; Telford Premiums to Major James Browne, R.E., William Douglass and Joseph McCarthy Meadows; and the Manby Premium to Leveson Francis Vernon-Harcourt, M.A. For some of the papers submitted by Students, Miller Prizes were presented to James Charles Inglis, Matthew Curry, jun. Walter Young Armstrong, Charles Graham, Smith, Alfred Fyson and George Edward Page. The cordial thanks of the meeting were unanimously accorded to the President, for his zealous efforts to promote on all occasions the interests of the Institution and of its members. The thanks of the meeting were likewise given to the Vice-Presidents and other members of council, for their co-operation with the President, and their constant attendance at the meetings; to Mr. Charles Manby, Honorary Secretary, and to Mr. James Forrest, Secretary, for the manner in which they had performed the duties of their offices, and to the Auditors of Accounts for their services. The Scrutineers of the Ballot (to whom a vote of thanks was passed by acclamation) announced that the following gentlemen had been elected to fill the several offices in the council for the ensuing year:—Thomas Elliot Harrison, President; William Henry Barlow, John Frederic Bateman, George Willoughby Hemans, and George Robert Stephenson, Vice-Presidents; James Abernethy, Sir William George Armstrong, C.B., Sir Joseph William Bazalgette, C.B., George Berkley, Frederick Joseph Bramwell, George Barclay Bruce, James Brunlees, Sir John Coode, William Pole, C. William Siemens, Sir Joseph Whitworth, Bart., and Edward Woods, members; and Major J. U. Bateman-Champain, R.E., John Head, and Colonel Charles Pasley, R.E., associates.

COMBUSTION OF OILS FOR STEAM GENERATION.

AT the members' meeting of the Inventors' Institute, on Thursday, December the 17th, 1874, Captain J. H. Selwyn, R.N., vice-president of the Institute, in the chair, a paper was read by W. Gadd, Esq., C.E., Manchester, on Combustion of Oils for Steam Generation. Mr. Gadd began by stating that although economy in the use of coal was not quite so pressing a matter as it was a year ago, it was still a subject of considerable moment; and, therefore, he need not dwell on the importance of any plan whereby the cost of coal could be kept down. In the Inventors' Institute they well knew that many plans were proposed for keeping under the price of coals as the result of diminishing the demand or reducing its cost by economical use—as by economizing the use of coal in furnaces, fireplaces, and stoves—by admixing with the coal large quantities of other combustible materials; also by the treatment of peat, so as to render it an available substitute for coal, and by facilitating the use of gas and other heat suppliers. However, for his part, though he quite believed that much might be done in any or all of these ways to effect the object in view, yet he deemed it more hopeful to direct attention to the advantages to be obtained by using oils, such as petroleum, for steam generation purposes, and the consequent freeing of a large quantity of coal from the demand for such purposes, for he held that for domestic use there was nothing like coal. At the same time, the application of oils to the generation of steam possessed the advantages of facility of adaptation, and great reduction in storage space, which for marine purposes was of itself enough to recommend them for adoption. Moreover, liquid fuel, such as oils afford us, allows of regular automatic stoking, so to speak, which may be easily effected by a ball tap system similar to that adopted in water supply. Further, liquid fuel would be supplied constantly, not intermittently, as is necessarily the case with coal and coke, which would avoid the frequent cooling of fresh supplies of solid fuel. Again, liquid fuel gives constant continuous heat power. Further, liquid fuel would be cheap, sometimes simply a waste product, as for instance crude creosote from coal tar, a very heavy hydro-carbon, which substance has the advantage of not being inflammable except at high temperatures. But in using the substance referred to some difficulties had to be overcome, as for instance the great quantity of flakes of smoke, and smoke means waste, and to avoid this, fluted bars had been used for spreading out the oil into a thin surface; but this did not prevent the smoke, and was difficult of regulation, and if too great a quantity be supplied the boiler plates soon burn.

Another plan was mixing the hydro-carbon with ashes. This had the recommendation of economy; but *per contra* clinkers formed, and the bars quickly burnt *away*. To blow steam into furnaces through a nozzle was another and much-favoured plan, oil being introduced also, the steam being caused to enter as a spray. But the proper adjustment of steam and oil was found very difficult, either too much or too little steam relatively to the oil being supplied, and in consequence of waste this plan works out to greater cost than coal. But the plan he, Mr. Gadd, advocated he would now describe by reference to his experiments, premising that the nozzle plan suggested this plan. He introduced water with the oil by means of an arrangement of a cast iron tray with pyramids provided with orifices, the oil to be kept at uniform depth in tray—say $\frac{3}{8}$ inch—by ball and tap arrangement, water being supplied from under side of pyramids to oil as burnt. Between the pyramids he had a range of small steam-pipes joined up, lying lengthways between the pyramids, about one-third being allowed to mix with the oil. This he found satisfactory to a certain extent, but a great drawbak was that oil and water together would boil, producing scum, and this scum would put out the flame. Steam pipes with fine jets, however, made the flame rise up in uniform brightness, intense heat, and great whiteness of flame, 7 feet high having been produced in the open air with no appreciable smoke. The oil used in the North was a waste product purchasable at 2d. per gallon. By regulating the flame to 3 feet high, 2 feet 6 inches long, and 18 feet wide, he found the flame lasted a considerable time. By these means Mr. Gadd considered he had obtained a good practical result—the ball tap effecting a self acting feeding action. One man could probably regulate fifteen or sixteen boilers so furnished, thus saving cost indirectly, independently of the cost of the fuel itself. He had found that petroleum burnt better if floating on water than if not so, and by this means the vessel was kept cool. He had tried another method, which was to cover the bottom with asbestos, the oil being introduced as spray blown on to it. The result was defective economically. His conclusion was that a slight substratum of water beneath oil, with steam jets and air supply, formed probably the best arrangement. The plan he advocated required no alteration of existing boiler and fire plate, as a tray could be slided in involving no great or expensive alteration—an advantage that admits of trial, and abandonment if not approved.

After the paper had been read the Chairman invited discussion, and in reply to Mr. MURRAY,

Mr. GADD said that steam would be required, in the first instance, to be supplied extraneously, but not afterwards, though this could be dispensed with by burning the oil somewhat to waste (for a short time only), producing smoke. The holes in steam pipes ought to be just above (clear of) the surface of the oil in the tray. Mr. Gadd remarked that he did not profess to explain exactly or dogmatise as to the philosophy of the action, but suggested that bubbles of the oil vapour rise through the water and become spread, and that the spreading action was beneficial.

In reply to Mr. Holten,

Mr. Gadd stated that a temperature of 500° or 600° was necessary to start the action. He would remark that he had practically carried out his plans in an ordinary two-flued boiler, and had experimented for twelve hours, the boiler doing its ordinary work. He used 60lb. pressure. The estimated saving over coal (coals at 18s. per ton), compared by normal standard at Manchester, was 30 per cent.

Captain Selwyn (the chairman) remarked that, as the papers read at the Inventors' Institute were always expected to have practical results, and as he had at the instance of the Government made a complete series of experiments in the use of petroleum for steam generation, and had tabulated the results, he would just mention some of them, which were these:—16lbs. water evaporated 1lb. of fuel, but not in short-flued marine boilers. As to the use of trays, Mr. Richardson had tried trays. Smoke had invariably been produced when there was a bright flame, but when blue greater heat; and wherever you get a bright flame you fail in heat. As a rule, 22lbs. water, evaporated by 1lb. fuel, was the best chemical result. Theoretically gas would be the best form of fuel, and next to that a liquid, because in combustion each particle can receive freely its oxygen. There was a practical difficulty to be apprehended in the use of oils, which was as to the demand for oil becoming greatly in advance of the supply. For marine purposes there was, no doubt, a great advantage in the use of oil over coal, for steam vessels (Government) would be capable of carrying many days' supply of fuel, instead of, as with coal, only a few days' supply. And as regards the difficulty of obtaining a sufficient supply of oils upon the absorption of waste products, he might mention that the distillation of shale, of which there was an abundant supply, would meet that difficulty, provided every other condition be satisfied. In concluding his observations, Captain Selwyn remarked that Mr. Gadd would do well to consult an able paper on this subject by the late Professor Macquorn Rankine, read at the United Service Institution, and published in its journal.

The Chairman then moved a vote of thanks for his paper to Mr. Gadd, which was seconded by Mr. Holton, and carried unanimously. This was acknowledged by Mr. Gadd; and the meeting concluded by passing a unanimous vote of thanks (duly responded to) to the Chairman.

G. B. KNOTT'S IMPROVED IMPLEMENTS FOR CLEANING, SCRAPING, AND STOPPING THE TUBES OF MARINE AND OTHER MULTITUBULAR BOILERS.

The set, complete, consists of four tools, to meet the varying requirements of the attendant to a marine or multitubular boiler.

No. 1 tool is for removing hard deposits of salt or other concreting substance. It has four cutting blades of steel, radiating from a centre to a diameter nearly equal to that of the tube to be cleaned. The stale, or handle, is of malleable iron, welded to the four blades, and of sufficient length to reach the extremity of the tube, and allow the operator to use it in the manner of a jumper, permitting the fragments to pass between the radial arms, or blades of the tool, and offering no obstruction to its forward and backward motion.

No. 2 tool is for cleaning out the tube when only slight obstructions are likely to be met with, and consists of two or more flat tongues, welded together at one end to form a junction piece, to which a suitable handle is screwed; the other ends are sprung out, and turned severally at right angles upward from their outer surfaces; the projecting faces are cut to a shape that, when pressed together, they shall form a circle of a diameter less than that of the tube. A dove-tailed slit is cut in each face, and a toothed guard piece passed through, one end being rivetted to the body of the scraper, the other dropping over and forming an incline plane to each scraper; these, on being pressed into the tube, close the scrapers to the diameter of the tube, and, should the scrapers be pushed beyond the extremity of the tube, the inner inclines that are rivetted to the tongues perform a like duty when the tool is being withdrawn. The teeth in the guard piece are so inclined as to offer no opposition to the progress of the tool, and are for a double purpose—first to scrape or rasp down any hard projections met with in the tube; secondly, they allow the guard to wear down at the same rate as the scrapers.

No. 3 tool is similar to the above, except that the guards have, like the scrapers, a spring, and are not made fast to the face of the scrapers, but work up and down each in a narrow slit cut in the face of the scraper, one end being welded with the tongues to form the junction piece. The guards have, in the place of teeth, a cutting edge that acts, when the tool is rotated, as a kind of borer, to drill away any hard concreted substance met with in the tube.

No. 4 tool is a tube brush and stopper, so adapted that although ordinarily used as a brush, it can, when required, be immediately converted into an efficient tube plug, by adding the end washer, but should a leak occur at the junction of the tube and the boiler plate, at the far end, No. 5 is introduced, which can be screwed on in place of the washer.

The inventor hopes, that in introducing these tools into the market, he has supplied a want long felt by the operative engineer. If the present demand be any criterion of their value, he is satisfied he has not supplied the deficiency too soon.

The Agents for this invention are the Engineering Agency Company, 21, Collingwood-street, Newcastle-on-Tyne.

SEAL SLAUGHTER.

For some time past great complaints have been made as to the manner in which the seal fishing has been prosecuted, and on all hands it has been agreed that if the wholesale slaughter which has taken place in years past is to be continued, there is nothing to look for except the total extermination of the animal. The Norwegian and Swedish Government have had the subject under consideration, and have lately made a representation concerning it to the authorities of this country. The result has been that recently Mr. Frederick Jennings, of the Board of Trade, visited Dundee, for the purpose of hearing the opinions of parties immediately interested. A very large meeting was held in the Bristol Hotel, at which most of the masters of the different sealing vessels belonging to Dundee and Peterhead attended, together with the representatives of the different companies to whom the vessels belong. A full explanation of the whole circumstances was made, and it appeared from the statements of the captains that for years past the practice has been to kill the seals almost immediately after birth, and that in many cases the mothers of the young have also been destroyed. There was an unanimity of opinion to the effect that if this course is pursued the probability is that seals, if not entirely exterminated, will be so reduced in numbers as to render the fishing unremunerative. It was, however, thought that no arrangement would be satisfactory which was not of an international character, and it was suggested that it might also be for consideration whether there should not be a provision to the effect that there might be no fishing at all in one out of five years. Ultimately the following resolutions were adopted:—

"That, in the opinion of those present, it is necessary, for the preservation of the seals and the permanent benefit of those engaged in the fishing, that a close time should be established."

"That fishing should not commence until the 5th of April yearly, and should not be prolonged beyond the 15th of May, the close time extending between said dates."

"That the close time should be enforced by treaty or agreement amongst the Governments of the countries to which the vessels engaged in the fishing belong, and that other Governments should be invited to become parties to said treaty or agreement in the event of vessels belonging to their subjects afterwards engaging in the trade."

"That, under the said treaty of agreement, penalties of considerable amount should be prescribed for infraction of the rules established by it, and that half of such penalties, or such portion as may be agreed upon, should be payable to the crews or parties who may give such information as shall lead to convictions against vessels or parties transgressing."

Upon the information which he has received, Mr. Jennings is to frame a report for the Board of Trade.

Correspondence.

To the Editor of the Scientific and Literary Review.

Sir,—I enclose you a copy of a report of trials of my patent fixed float feathering wheels *versus* the ordinary feathering float wheels, which, perhaps, you may be pleased to insert in your journal. No doubt the compound advantages gained by my wheels, particularly in a sea way—no vibration, no back water, and less consumption of steam, which means, of course, less coal, either light or deep draught of vessel, with increased speed—will be easily perceived by various naval and engineering readers of your journal.—Yours truly,

J. McGregor Croft, M.D.,
M.C. Institute of Inventors.
15, Abbey-road, N.E.,
January 4th, 1875.

Woolwich Steam Packet Company (Limited), Engine Factory, December 17th, 1874.—To John Mason, Esq., Secretary W.S.P. Company.—Dear Sir,—Of late I have had my attention drawn to a fixed float feathering paddle wheel, by Dr. Croft, of 15, Abbey-road, St. John's Wood, and attended two sets of experiments by dynamometer at his residence. The object of the experiments was to demonstrate the superiority of Dr. Croft's arrangements *versus* the feathering wheels in use in this fleet. On the first trials, the apparent advantage was about 20 per cent., but on examining Dr. Croft's model of the ordinary feathering wheels, I suggested to him improvements that were necessary and requisite to approach greater perfection, and to make a fair comparison. The defects were candidly admitted, and promptly remedied. On Friday, the 11th instant, I attended the Marylebone Swimming Baths to witness trials on a more extended scale. Dr. Croft's wheels and hull are modelled to a scale of half an inch to the foot. The boat is six feet long, and the paddle wheels six inches in diameter, proportioned in width and number of floats. The power of propelling is stored in a clock-work spring, wound up to an equal tension for each set of trials. The bath is sixty-five feet long. The clock-work spring was allowed to run out in each trial.

Ordinary Feathering Float Wheels.—First Trial (ahead)—Runs: 1, 51 seconds; 2, 60; 3, 62; 4, 68; 5, 95; total, 336 seconds; mean time, 67 1-5th seconds.

Second Trial (ahead)—Runs: 1, 55 seconds; 2, 60; 3, 68; 4, 78; 5, 90; total, 351 seconds; mean time, 70 1 5th seconds.

Dr. Croft's Fixed Float Feathering Wheels. —First Trial (ahead)—Runs: 1, 48 seconds; 2, 53; 3, 58; 4, 62; 5, 76; total, 297 seconds; mean time 57 2-5th seconds. Second Trials (ahead)—Runs: 1, 46 seconds; 2, 51; 3, 55; 4, 63; 5, 80; total, 295 seconds; mean time, 59 seconds.

Dr. Croft's Wheels Astern.—First Trial (astern)—Runs: 1, 53 seconds; 2, 55; 3, 59; 4, 71; total, 238 seconds; mean time, $59\frac{1}{2}$ seconds. Second Trial (astern)—Runs: 1, 48 seconds; 2, 55; 3, 65; 4, 71; total, 239 seconds; mean time, $59\frac{3}{4}$ seconds.

It will be seen that we had two trials ahead with both sets of wheels, and two trials astern only with Dr. Croft's wheels. The latter could easily be reversed by putting them on reverse ways on the paddle shaft, while the others could not on account of the eccentric studs, &c., &c., which secure on the spring beams. The trials show a speed of fully 10 per cent. in favour of Dr. Croft's wheels, and if he could only succeed in gaining the same speed on a commercial scale, he would have a great advantage in point of first cost of construction, and a permanent saving in the whole of the cost of the renewal and maintenance of the numerous wearing surfaces of the ordinary feathering wheels.—Yours respectfully, (Signed) T. Chambers, Superintendent Engineer, Woolwich Steam Packet Company.—Captain James Simpson, R.N., late Commander of Her Majesty's Royal yacht Victoria and Albert, witnessed and confirmed the trials.—J. McG. Croft.

NOTICES TO CORRESPONDENTS.

Fraser and Dewar on Creation.—We have received a communication from a highly-esteemed correspondent with regard to this work, but we are compelled to postpone its insertion.

Mr. Mabson (Sheffield).—Notice of the work by this gentleman is also postponed.

APPLICATIONS FOR LETTERS PATENT.

Continued from page 18.

the production therefrom of a compound body, capable of being used as a substitute for malt in brewing, and for other purposes.—W. Mather. Apparatus for measuring liquids for obtaining motive power, and for exhausting and forcing air and other gases and fluids (com.)—J. Shawcross. Steam engines(com.)—G. Knowles Carding engines.—J. Robinson and J. Smith. Machinery for sawing wood.

On November 13th.—3914 to 3926.—G. Weston. Steam generator, and construction of steam engine boilers, principally applicable to locomotive boilers, and apparatus therefor.—G. Spiers. Mode of adapting ball-wound thread for use in hand or machine sewing.—F. W. Webb. Mechanism or arrangements for actuating and interlocking railway points and signals.—F. P. Preston, J. T. Prestige, E. J. Preston, and J. A. Fowler. Pumps.—W. R. Lake. Ratchet-brace or drilling apparatus (com.)—J. Braidwood. Apparatus for discharging water and air from pipes and vessels heated by steam.—G. Roby. Vessels for containing gunpowder or other materials —B. Samuelson and W. G. Manwaring. Harvesting machines.—W. N. Dack. Construction of hydraulic and other presses, and steam engines and pumps for working the same, and for other purposes.—E. H. Bayley. Construction and working of slop carts and waggons.—H. Collett. Watches and other time-keepers.—C. Wood. Machinery for making concrete and other bricks.—F. Ransome. Manufacture of artificial stone.

On November 14th.—3927 to 3935.—A. H. Colles and W. H. Bailey. Apparatus for indicating or recording the score in the game of billiards and other games of skill or chance, and the time occupied by the same, also applicable to other indicating or recording purposes.—W. Richards. Instruments for measuring fluids.—C. Staker. Method of instantly releasing one or more horses from vehicles.—J. Lott. Composition for prevention of potato disease, applicable also for dressing and manuring land for other agricultural purposes.—P. Holland. Boots and shoes. —J. Bagot. Railway signals.—J. Cameron. Manufacture of iron and steel.—J. W. Gray. Compound to be used as a blasting powder, and for other purpose or purposes, and to be known by the name of "Carboazotine" (com) (Complete specification.) — A. M. Clark. Chemical copying telegraphs, electrical circuits, and apparatus connected therewith, otherwise designated as fac-simile autographic or pantographic telegraphs, or pantelegraphs, also applicable to other telegraphs (com.) (Complete specification.)

On November 16th.—3936 to 3945.—J. Reading and S. A. Reading. Sleeve studs, solitaires, and other like dress fastenings and ornaments.—J. L. Pulvermacher. Apparatus or appliances connected with generating, conducting, measuring, or testing and applying electricity for medical and other purposes.—J. Evans. Pumps. G. Stevenson and J. Reid. Drawing trains up inclines, and machinery therefor, the same being also applicable to other hauling or winding operations.—R. Young. Apparatus for treating or purifying ground wheat, such as is known as sharps or middlings.—F. Curtis. Machines for darning stockings (com.) (Complete specification).—H. De Garrs. Skates.—J. Combe. hackling machines (com.)—G. Burney. Magazines for storing gunpowder and other explosives, and inflammable liquids.—T. Potter. Apparatus for constructing concrete buildings and structures.

On November 17th.—3946 to 3962.—J. G. Tongue. Preserving animal and vegetable substances (com.)—P. A. Despaquis. Preparation of gelatine and albumen photographic plates for printing from with lithographic inks. —H. Latour. Machinery for picking, carding, and spinning both old and new cordage, and all materials suitable for the caulking of ships, for combing flax and hemp, and for picking rags and other textile materials used in paper-making.—W. McAdam. Furnaces used in the manufacture of glass.—W. Garton. Manufacture of sugar for brewing and other purposss. —P. Parthel. Shoe and boot cleaning machine (com.)—N. Jacobsohn. Domestic stoves.—N. Jacobsohn. Envelopes for letters.—J. Bacon. Hydraulic pumps.—S. Hallam and J. W. Lamb. Fittings for glass water gauges.—S. De la G. Williams. Kilns for burning lime, bricks, and pottery ware, and for other like purposes.—F. D. Frost. Machinery for heckling hemp and other fibres.—E. Wright. Operating sewing and other treadle machines (Complete specification.)—J. Starley. Velocipedes, part of which improvements is applicable to other wheel vehicles.—R. Hulme and E. Lund. Pumps.—J. H. Louche. Rotary engines.—G. Potter. Process of manufacturing gongs, cymbals, and other musical instruments.

On November 18th.—3963 to 3974.—W. H. Dowland. Sockets for bolts, studs, valve box covers, and covers for post sockets.—L. K Scott. Sighting ordnance and the apparatus employed therein.—H. Smith. Construction of organs and other musical instruments.—J. McAdam. Pulley blocks.—G. Burch. Construction of hat frames for shaping the brims of felt hats.—A. Tood and E. Wright. Apparatus for working or operating revolving shutters.—E. Shepherd and A. Shepherd. Window sashes. —A. M. Clark. Securing tires on the wheels of locomotives or other railway vehicles (com.) (Complete specification.)—J. Taffinder, M. Wilson, and D. Hall. Means or apparatus for transmitting, regulating, and stopping the motion of saw frames and other machinery.—T. Sutcliffe. Manufacture of bottles for containing aërated liquids.—H. L. Smith. Rails and wheel tyres adapted thereto.—L. Sterne. Telegraph insulators.

On November 19th.—3975 to 3984.—N. Jacobsohn. Apparatus for delivering small quantities of liquid applicable for moistening envelopes and stamps, and for inkstands, lubricators, scent bottles, and other like purpeses.—H. Hughes. Portable and other steam-engines.—G. Ritchie. Mode or modes of manufacturing muffs, foot-warmers, slippers, waist and chest protectors, caps, and other like articles of clothing.—F. W. Dahne. Separating tin and zinc from iron and other impurities, and also separating from silver and lead the zinc which has been employed in desilverizing the lead.—P. Barthel. Lathe for turning elliptical, polygonal, and other forms (com.)—R. Kilburn. Milling machines.—N. Jacobsohn. Apparatus for taking and numbering votes, also applicable for registering fares or the numbers constituting different groups or sets.—C. Laubarede. Manufacture of beer (com.)—A. V. Newton. Sewing machines (com.)—J. H. Johnson. Apparatus for indicating fire or increase of temperature, which apparatus is partly applicable to other signalling purposes (com.)

On November 20th.—3985 to 3995.—T. Evans. "Fishing" the rails of railways (com.)—W. Thompson treatment of wool, hair, or other animal or vegetable fibres, for the manufacture of hair-pads or "frisettes" and for other like purposes, and machinery or apparatus therefor. —J. J. Duke. Sound alarm apparatus for scareing or frightening birds.—W. T. Walker. construction of gas purifiers.—J. H. Selwyn. Breech-loading fire-arms.—T. H. Pinder. System of glazing or fixing sheets or panes of glass in frames or sashes and the means employed therein.—A. P. Dickinson and W. Parkinson. Looms for weaving.— W. Batten. Combined ventilator and flushing box and lamp hole for sewers.—T. Holden. Cement.—M. Macleod. Constructing buildings of concrete and other plastic materials and apparatus employed therein.—R. Nicholas. Construction of rack pulleys foe window blinds.

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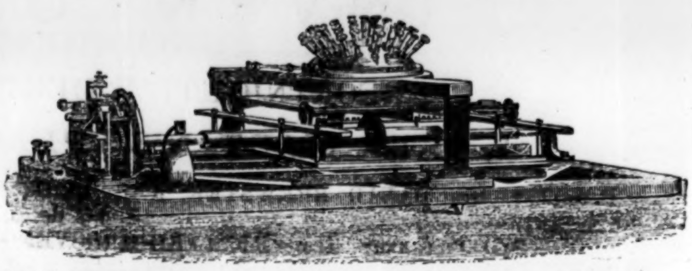

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